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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. PCT/SE99/00407

International Filing Date 17-03-1999

Name of receiving Office and "PCT International Application": The Swedish Patent Office PCT International Application

Applicant's or agent's file reference *(if desired) (12 characters maximum)* 10317 ARe

Box No. I TITLE OF INVENTION

Material laminate for use as an outer layer on absorbent products.

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

SCA Hygiene Products AB
S-405 03 GÖTEBORG
Sweden

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: Sweden

State *(that is, country)* of residence: Sweden

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

HEDENBERG Peter
Marklandsgatan 61
S-414 77 GÖTEBORG
Sweden

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

GRAUDUMS Valdis, MOSSMARK Anders, KRISTIANSEN Alf P., ROMARE Anette, ANDERSSON Per, BERGQUIST Gunnar, BURÖ Peter, ROSANDER Bengt, SCHLOSSMAN Ulf,
Albihns Patentbyrå Göteborg AB
Box 142
S-401 22 GÖTEBORG, SWEDEN

Telephone No. +46 31 725 81 00

Facsimile No. +46 31 711 95 55

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Sheet No. 2

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

HANSSON Roy
Ålegårdsgatan 112
S-431 50 MÖLNDAL
Sweden

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☒ the United States of America only
- ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

TENNBY Anders
Lagmansgatan 20 C
S-416 53 GÖTEBORG
Sweden

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

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ELFSTRÖM Anna-Carin
Krossholmsvägen 1074
S-423 38 TORSLANDA
Sweden

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

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KROOK Fredrik
Schaktmästaregatan 7
S-412 61 GÖTEBORG
Sweden

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

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- ☒ all designated States except the United States of America
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- ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

GUSTAFSSON Anders
Kofferdalsvägen, PL 5181
S-427 35 BILLDAL
Sweden

This person is:

- [ ] applicant only
- [x] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SE

State *(that is, country)* of residence: SE

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [x] the United States of America only
- [ ] the States indicated in the Supplemental Box

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This person is:

- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

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State *(that is, country)* of residence:

This person is applicant for the purposes of:
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- [ ] all designated States except the United States of America
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This person is:

- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:

- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

- [ ] Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

- ☒ **AP** **ARIPO Patent:** **GH** Ghana, **GM** Gambia, **KE** Kenya, **LS** Lesotho, **MW** Malawi, **SD** Sudan, **SZ** Swaziland, **UG** Uganda, **ZW** Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** **Eurasian Patent:** **AM** Armenia, **AZ** Azerbaijan, **BY** Belarus, **KG** Kyrgyzstan, **KZ** Kazakhstan, **MD** Republic of Moldova, **RU** Russian Federation, **TJ** Tajikistan, **TM** Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** **European Patent:** **AT** Austria, **BE** Belgium, **CH and LI** Switzerland and Liechtenstein, **CY** Cyprus, **DE** Germany, **DK** Denmark, **ES** Spain, **FI** Finland, **FR** France, **GB** United Kingdom, **GR** Greece, **IE** Ireland, **IT** Italy, **LU** Luxembourg, **MC** Monaco, **NL** Netherlands, **PT** Portugal, **SE** Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** **OAPI Patent:** **BF** Burkina Faso, **BJ** Benin, **CF** Central African Republic, **CG** Congo, **CI** Côte d'Ivoire, **CM** Cameroon, **GA** Gabon, **GN** Guinea, **GW** Guinea-Bissau, **ML** Mali, **MR** Mauritania, **NE** Niger, **SN** Senegal, **TD** Chad, **TG** Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

- ☒ **AL** Albania
- ☒ **AM** Armenia
- ☒ **AT** Austria
- ☒ **AU** Australia
- ☒ **AZ** Azerbaijan
- ☒ **BA** Bosnia and Herzegovina
- ☒ **BB** Barbados
- ☒ **BG** Bulgaria
- ☒ **BR** Brazil
- ☒ **BY** Belarus
- ☒ **CA** Canada
- ☒ **CH and LI** Switzerland and Liechtenstein
- ☒ **CN** China
- ☒ **CU** Cuba
- ☒ **CZ** Czech Republic
- ☒ **DE** Germany
- ☒ **DK** Denmark
- ☒ **EE** Estonia
- ☒ **ES** Spain
- ☒ **FI** Finland
- ☒ **GB** United Kingdom
- ☒ **GD** Grenada
- ☒ **GE** Georgia
- ☒ **GH** Ghana
- ☒ **GM** Gambia
- ☒ **HR** Croatia
- ☒ **HU** Hungary
- ☒ **ID** Indonesia
- ☒ **IL** Israel
- ☒ **IN** India
- ☒ **IS** Iceland
- ☒ **JP** Japan
- ☒ **KE** Kenya
- ☒ **KG** Kyrgyzstan
- ☒ **KP** Democratic People's Republic of Korea
- ☒ **KR** Republic of Korea
- ☒ **KZ** Kazakhstan
- ☒ **LC** Saint Lucia
- ☒ **LK** Sri Lanka
- ☒ **LR** Liberia
- ☒ **LS** Lesotho
- ☒ **LT** Lithuania
- ☒ **LU** Luxembourg
- ☒ **LV** Latvia
- ☒ **MD** Republic of Moldova
- ☒ **MG** Madagascar
- ☒ **MK** The former Yugoslav Republic of Macedonia
- ☒ **MN** Mongolia
- ☒ **MW** Malawi
- ☒ **MX** Mexico
- ☒ **NO** Norway
- ☒ **NZ** New Zealand
- ☒ **PL** Poland
- ☒ **PT** Portugal
- ☒ **RO** Romania
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- ☒ **SG** Singapore
- ☒ **SI** Slovenia
- ☒ **SK** Slovakia
- ☒ **SL** Sierra Leone
- ☒ **TJ** Tajikistan
- ☒ **TM** Turkmenistan
- ☒ **TR** Turkey
- ☒ **TT** Trinidad and Tobago
- ☒ **UA** Ukraine
- ☒ **UG** Uganda
- ☒ **US** United States of America
- ☒ **UZ** Uzbekistan
- ☒ **VN** Viet Nam
- ☒ **YU** Yugoslavia
- ☒ **ZW** Zimbabwe

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☒ ZA South Africa
- ☐ .....
- ☐ .....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application: receiving Office
item (1) 27 March 1998	9801038-2	SE		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): (1)

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):* ISA / SE

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* 27 March 1998 Number SE98/00271 Country *(or regional Office)* SE

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	:	5 ✓
description (excluding sequence listing part)	:	15 ✓
claims	:	3 ✓
abstract	:	1 ✓
drawings	:	4 ✓
sequence listing part of description	:	
Total number of sheets	:	28 ✓

This international application is **accompanied** by the item(s) marked below:

1. ☐ fee calculation sheet
2. ☒ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☒ translation of international application into (language): English
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other *(specify)*: ITS Report, Copy of official action

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Göteborg, Sweden 16 March 1999

Anette Romare

Anette Romare

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1. Date of actual receipt of the purported international application: 17 -03- 1999
2. Drawings: ☒ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA / SE
6. ☐ Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau: 09 APRIL 1999 (09.04.99)

TITEL:

MATERIALLAMINAT FÖR ANVÄNDNING SOM YTSKIKT PÅ ABSORBERANDE ALSTER

TEKNISKT OMRÅDE:

Uppfinningen avser ett materiallaminat för användning som ytskikt på absorberande alster såsom blöjor, byxblöjor, inkontinensskydd, dambindor, förband, eller liknande. Materiallaminatet uppvisar en planutsträckning och en tjockleksled vinkelrätt mot planutsträckningen och innefattar ett första vätskegenomsläppligt fibröst materialskikt och ett andra vätskegenomsläppligt, poröst och spänstigt materialskikt, varvid åtminstone ett av materialskikten innefattar termoplastiskt material och de båda materialskikten är inbördes förbundna genom att materiallaminatet uppvisar bindningsställen inom vilka det termoplastiska materialet bringats att åtminstone delvis mjukna eller smälta och därigenom sammanbinda de båda materialskikten Uppfinningen avser även ett absorberande alster innefattande materiallaminatet.

BAKGRUND:

Absorberande alster, vilka är avsedda för engångsbruk, uppvisar vanligen ett vätskegenomsläppligt ytskikt, vilket vid användning av alstret är vänt mot användarens kropp. Ett sådant ytskikt utgörs ofta av ett nonwovenmaterial, dvs. ett fibertyg där de ingående fibrerna bundits samman på något annat sätt än medelst vävning.

Det är även känt att anordna ett vätskeöverföringsskikt mellan ytskiktet och en i alstret ingående absorptionskropp. Ett sådant vätskeöverföringsskikt bör ha förmåga att snabbt ta emot stora vätskemängder och sprida vätskan, samt tillfälligt lagra den innan den absorberas av

den underliggande absorptionskroppen. Detta är av stor vikt, i synnerhet vid dagens tunna, komprimerade absorptionskroppar, vilka ofta har en hög halt av s k superabsorbenter. Sådana material har visserligen hög absorptionskapacitet, men uppvisar i många fall en alltför låg insläppshastighet för att momentant hinna absorbera den stora mängd vätska som vid urinering kan avges under ett fåtal sekunder. Ett poröst, relativt tjockt vätskeöverföringsskikt, exempelvis i form av en fibervadd, ett bundet, eller obundet kardat fiberskikt, eller någon annan typ av fibermaterial har hög momentan vätskemottagningskapacitet och kan tillfälligt lagra vätskan tills den hunnit absorberas av absorptionskroppen. Detta förhållande gäller även för porösa skummaterial. För att det absorberande alstret skall kunna ta emot upprepade vätskevolymer, är det nödvändigt att vätskeöverföringsskiktet väsentligen hinner tömmas på vätska mellan varje vätning. Den porösa strukturen hos vätskeöverföringsskiktet samverkar därvid lämpligen med en tätare och/eller mer hydrofil absorptionskropp.

Exempel på absorberande alster vilka innehåller porösa vätskeöverföringsskikt finns i US-A-3,371,667, EP-A-0,312,118, EP-A-0,474,777, EP-A-685,214 och WO 97/02133.

Ett problem vid de beskrivna absorberande alstren, är att de vätskegenomsläppliga ytskiktsmaterialen ofta uppvisar en effektiv medelporstorlek som är mindre än det underliggande mottagningsskiktets medelporstorlek. För att förbättra vätskeöverföringen mellan ytskiktet och vätskeöverföringsskiktet har i EP-A-685,214 och WO 97/02133 föreslagits att de båda skikten binds samman med varandra, genom sammansmältning av skikten i ett bindningsmönster i form av punkter, eller linjer. En nackdel med att anordna ett stort antal bindningar på ett litet inbördes avstånd, är emellertid att ytmateriallaminatet förlorar volym och

därmed mjukhet och hudvänlighet. Bindningarna medför vidare att materiallaminatet blir förhållandevis styvt och även av detta skäl mindre komfortabelt att bära i anliggning mot hud. Genom att bindningarna minskar laminatets volym, dvs dess tjocklek, minskar dessutom avståndet mellan alstrets absorptionskropp och användarens kropp. Därigenom är risken för att vätska skall tränga tillbaka ut ur alstret och väta användarens kropp förhöjd.

Det kvarstår således ett behov av ett förbättrat ytmaterial med god vätskeöverföringsförmåga och låg återvätning, samt med hög mjukhet, hudvänlighet och följsamhet.

KORT BESKRIVNING AV UPPFINNINGEN:

Med föreliggande uppfinning har åstadkommits ett materiallaminat av det i inledningen angivna slaget. Materiallaminatet enligt uppfinningen utmärks främst av att bindningsställena sträcker sig i materiallaminatets tjockleksled genom det första materialskiktet och åtminstone genom en del av det andra materialskiktet och är anordnade i två eller flera grupper med minst två bindningsställen i varje grupp varvid det största inbördes avståndet mellan två invid varandra belägna bindningsställen i en viss grupp är mindre än det minsta avståndet mellan gruppen och dess närmast belägna granngrupp, varigenom materiallaminatet uppvisar bindningsfria områden mellan bindningsställena inom varje bindningsgrupp vilka har högre densitet än bindningsfria områden av materiallaminatet vilka är belägna mellan bindningsgrupperna.

Ytterligare särdrag och utföringsformer framgår av de efterföljande patentkraven.

Genom att i enlighet med uppfinningen anordna bindningarna i ett mönster som skapar av bindningarna begränsade områden med högre fibertäthet, omväxlande med områden med lägre fibertäthet, erhålls ett materiallaminat med hög bulk, mjukhet och böjlighet, samtidigt som vätskeöverföringsförmågan och förmågan att temporärt lagra vätska är mycket god. Ett materiallaminat i enlighet med uppfinningen är vidare mycket luftigt och behagligt att bära mot huden och uppvisar låg återvätning.

KORT BESKRIVNING AV FIGURER:

Uppfinningen skall i det följande beskrivas mer utförligt, under hänvisning till de figurer som visas på de bifogade ritningarna.

Därvid visar:

Figur 1 en planvy av ett materiallaminat enligt uppfinningen,

Figur 2 ett snitt utefter linjen II-II genom materiallaminatet i figur 1,

Figur 3 ett första bindningsmönster,

Figur 4 ett andra bindningsmönster,

Figur 5 ett tredje bindningsmönster,

Figur 6 ett fjärde bindningsmönster,

Figur 7 ett femte bindningsmönster, och

Figur 8 ett inkontinensskydd med ett materiallaminat enligt uppfinningen.

BESKRIVNING AV UTFÖRINGSFORMER:

Det i figur 1 och 2 visade materiallaminatet 1 innefattar ett första materialskikt 2, samt ett andra materialskikt 3. Det första materialskiktet 2 utgörs därvid lämpligen av ett förhållandevis tunt nonwoven-material.

Nonwovenmaterial kan framställas med många olika metoder, exempelvis genom kardning eller spinning av ett fiberflor som därefter binds. Vidare kan s.k. melt-blown-teknik användas för att avsätta korta fibrer i form av en fibermatta. Det finns en rad olika sätt att binda fibrerna i ett nonwovenmaterial. Exempelvis kan olika typer av bindemedel användas. Vidare kan värmesmältbara komponenter i materialet utnyttjas för bindning med ultraljud, eller genom värmetillförsel. Andra bindningsmetoder är nålning och hydroentangling. Olika bindningsmetoder kan dessutom kombineras med varandra.

Då materiallaminatet används som vätskegenomsläppligt ytmaterial på ett absorberande alster, är det första materialskiktet 2 det skikt vilket är avsett att vara vänt mot en användare av alstret. Det är därvid viktigt att det första skiktet har en slät, mjuk yta vänd mot användaren.

Det andra materialskiktet 3 har med fördel större tjocklek än det första materialskiktet 2 och utgörs av ett poröst, spänstigt fibermaterial med en tjocklek från 0,5-4 mm. Det andra materialskiktet 3 tjänar som vätskeöverföringsskikt då materiallaminatet är anbragt som ett ytmaterial på ett absorberande alster. Därvid bör det andra materialskiktet 3 ha förmåga att på kort tid ta emot stora mängder vätska, sprida vätskan i materialskiktets plan, föra vätskan vidare till en under materiallaminatet 1 anordnad absorptionskropp, samt dessutom kunna tillfälligt lagra vätska som inte hunnit absorberas av absorptionskroppen.

Material som är särskilt lämpade för användning i det andra materialskiktet är syntetfibervaddar, kardade bundna eller obundna fiberskikt, eller bulkiga nonwovenmaterial. En speciell typ av fibermaterial som kan utnyttjas är s.k. tow, varmed förstås huvudsakligen parallella, långa eller oändliga fibrer, eller fiberfilament vika föreligger i form av skikt, eller strängar. En annan typ av lämpligt material är porösa hydrofila skummaterial. Det andra materialskiktet kan vidare bestå av två eller flera lager av olika eller samma typ av material.

Som ett på intet sätt begränsande exempel på ett materiallaminat enligt uppfinningen kan nämnas ett sammansatt nonwovenmaterial bestående av ett första materialskikt 2 av ett nonwovenmaterial av syntetfibrer med en ytvikt mellan 10 och 50 g/m^2 och ett andra materialskikt 3 av en vadd av syntetfibrer med en ytvikt mellan 20 och 100 g/m^2. Åtminstone det första materialskiktet 2 och företrädesvis båda skikten 2,3 innefattar termoplastiskt material. Lämpliga termoplastiska material är polyolefiner såsom polyeten och polypropen, samt polyamider, polyester och liknande. Även olika typer av så kallade bikomponentfibrer kan användas.

De båda materialskikten 2,3 är inbördes förbundna med ett stort antal bindningsställen 4. Bindningsställena 4 är därvid i det närmaste punktformiga och har bildats genom samtidig komprimering och energitillförsel till materiallaminatet 1. Därvid har det termoplastiska materialet bringats att mjukna, eller smälta vid bindningsställena 4 och därigenom binda samman de båda i materiallaminatet 1 ingående skikten 2,3. Sammanbindning av det första och det andra materialskiktet 2,3 sker lämpligen medelst värmebindning, eller genom ultraljudsbindning.

Bindningsställena 4 är anordnade i grupper 5 med fyra bindningsställen 4 i varje grupp 5. De fyra bindningarna är därvid placerade så att de bildar hörnen i en kvadrat. De inbördes avståndet mellan bindningsställena 4 i varje grupp är mindre än det inbördes avståndet mellan grupperna 5. Därvid bestäms avstånden inom grupperna 5 såsom det närmaste avståndet mellan intill varandra liggande bindningsställen 4. På motsvarande vis bestäms avståndet mellan grupperna 5 såsom det närmaste avståndet mellan intill varandra liggande grupper 5. Avståndsmätningarna görs, i båda fallen, från bindningsställenas 4 kanter. Det minsta avståndet mellan intilliggande grupper, mätt mellan de närmast varandra placerade bindningsställena 4 i respektive grupp 5, är lämpligen 2-6 mm och det största avståndet mellan intill varandra placerade bindningsställen 4 inom grupperna är lämpligen 0,5-1 mm. Det förstnämnda avståndet är därvid åtminstone ca. dubbelt så stort som det sistnämnda avståndet.

Vid avsvalning av det smälta, eller mjuknade termoplastiska materialet i laminatet 1, stelnar detta och tjänar som bindemedel för materiallaminatet. Förutom sammanbindning av de båda materialskikten 2,3 erhålls därvid en bestående komprimering, eller förtätning av den porösa strukturen i materialskikten 2,3. Mest påtaglig är förtätningen vid själva bindningsställena 4. Vidare innebär den speciella placeringen av bindningsställena 4, att det sammanbundna materiallaminatet 1 uppvisar kvadratiska områden 6 omgärdade av bindningsställena 4 i grupperna 5 och uppvisande högre förtätning än områden 7 mellan grupperna 5.

Det i figurerna 1 och 2 visade materiallaminatet 1, är sammanbundet på ett sådant sätt, att det bildats genomgående hål 8 i det första materialskiktet 2 vid bindningsställena 4. Dessutom är materialet inom och

närmast kring bindningsställena 4 kraftigt förtätat, med finare kapillärer än omgivande material. Härigenom utgör bindningsställena områden med ökad förmåga att släppa genom vätska från det första materialskiktet 2 till det andra materialskiktet 3.

Även om materiallaminatet 1 visas med genomgående hål 8 i det första materialskiktet 2, är ett sådant utförande inte nödvändigt för uppfinningen. Således omfattas även sådana materiallaminat där bindningsställena 4 uppvisar en yta av mer eller mindre vätskeogenomtränglig karaktär, eller materiallaminat med både genomgående hål och vätsketäta bindningar. Bindningsställen med låg, eller ingen vätskegenomsläpplighet erhålls exempelvis om materiallaminatet innehåller en hög andel termoplastiskt material som smälts och därefter tillåts stelna till en filmliknande yta. Även om själva bindningsställena 4 är i det närmaste helt vätsketäta, medför den förtätade fiberstrukturen som uppstått kring bindningsställena 4 genom den komprimering som sker i samband med bindningen att området närmast kring varje bindningsställe 4 ändå uppvisar mycket hög vätskeöverföringsförmåga.

Vidare utgör de förtätade områdena 6 innanför bindningsställena 4 i varje grupp 5 av bindningsställen zoner med förhöjd vätskeöverföringsförmåga. Genom att avståndet mellan bindningsställena 4 inom varje grupp 5 är förhållandevis litet och företrädesvis från 0,5 mm till 1 mm, medför komprimeringen i bindningsställena 4 att även området 6 innanför bindningsställena 4 påverkas, så att en tätare struktur erhålls. Således är kapillärstorleken i de förtätade områdena 6 som avgränsas av bindningsställena 4 i medeltal mindre än i områden av materiallaminatet 1 som är belägna mellan grupperna 5 av bindningsställen 4. Detta innebär att materiallaminatet 1 uppvisar en vätskeöverföringsförmåga som i förhållande till

bindningsställenas 4 sammanlagda yta är mycket hög. Den sammanlagda bundna ytan utgör företrädesvis 3-11% av den totala ytan. Den förvånansvärt goda vätsketransport- och vätskeöverföringsförmågan beror på att inte bara själva bindningsställena 4 och områdena omedelbart intill dessa uppvisar förhöjd vätskeöverföringsförmåga, utan att även de områden som är belägna mellan bindningsställena 4 i en grupp 5 bidrar till den förbättrade vätskeöverföringen.

Genom uppfinningen är det således möjligt att skapa områden med större täthet och därmed ökad vätsketransportförmåga, men ändå bibehålla hög bulk, mjukhet och följsamhet hos materiallaminatet 1.

Figur 3 visar ett bindningsmönster för ett materiallaminat 1 enligt uppfinningen. Bindningsmönstret består av rombiska bindningsställen 4 anordnade i grupper 5' om fyra bindningsställen 4 i varje grupp 5'. Vidare uppvisar bindningsmönstret i figur 3 överordnade gruppbildningar 5'' om fyra grupper 5' med vardera fyra bindningsställen 4. I bindningsmönstret i figur 3 kan således identifieras tre olika typer av områden 6,7,9 med inbördes olika materialtäthet. Den tätaste materialstrukturen, med minst porstorlek återfinns därvid inom grupperna 5' bestående av fyra bindningsställen 4. Områden 7 med något mindre täthet och därigenom något större porstorlek återfinns i de överordnade gruppbildningarna 5'' av grupper 5' med vardera fyra bindningsställen 4. De minst täta områdena 9, slutligen, återfinns mellan de överordnade gruppbildningarna 5'' och mellan de överordnade gruppbildningarna 5'' och enstaka grupper 5 av bindningsställen 4, vilka är anordnade mellan de överordnade gruppbildningarna 5''.

Figur 4 visar bindningsställen 4 i form av korta (1-1,5 mm) streck-formade bindningar anordnade i huvudsakligen

parallella stråk 5 med ett inbördes avstånd mellan stråken som överstiger avståndet mellan de i stråken ingående bindningsställena 4. Inom stråken föreligger förtätade områden 6 mellan bindningsställena 4, uppvisande mindre porstorlek än områden 7, belägna mellan stråken 5.

Ytterligare användbara bindningsmönster visas i figurerna 5-7, varvid figur 5 visar huvudsakligen parallella, vågiga bindningslinjer 4 anordnade parvis med ett inbördes avstånd mellan bindningslinjerna 4 i varje par 5 som överstiger avståndet mellan paren 5 av bindningslinjer 4. Således erhålls med det i figur 5 visade bindningsmönstret ett materiallaminat med förtätade vätskeöverföringsområden mellan bindningslinjerna 4 i varje par och bulkiga, distansskapande, mjuka och luftiga områden 7 mellan bindningsparen 5.

En fördel med att ordna bindningställena 4 i form av stråk, eller linjer, är att ett ytmaterial med ett sådant bindningsmönster huvudsakligen leder vätska i utmed stråken, eller linjerna och motverkar vätskespridning vinkelrätt mot stråken eller linjerna. Detta förhållande kan med fördel utnyttjas för att minska risken för kantläckage för ett absorberande alster.

Figur 6 visar ett mönster med grupper 5 vardera bestående av två bindningsställen 4 i form av koncentriska ringar, vilka avgränsar förtätade områden 6, medan områden 7 med mindre täthet återfinns utanför det yttre av de ringformiga bindningsställena 4.

Figur 7 visar ett mönster av korta parallella bindningsstreck 4 anordnade parvis på ett inbördes avstånd så att det bildas förtätade områden 6 mellan bindningsstrecken 4 i varje par 5 och mindre täta områden mellan paren av bindningsstreck 4.

Det i figur 8 visade inkontinensskyddet 10 innefattar ett materiallaminat 1 enligt uppfinningen, innefattande ett vätskegenomsläppligt ytskikt 2, samt ett vätskegenomsläppligt vätskeöverföringsskikt 3. Det vätskegenomsläppliga ytskiktet 2 innesluter tillsammans med ett vätsketätt ytskikt 11 en absorptionskropp 12. De båda ytskikten 2,11 har något större utsträckning i planet än absorptionskroppen 12 och sträcker sig ett stycke utanför absorptionskroppens kanter. Ytskikten 2,11 är inbördes förbundna inom de utskjutande partierna 13, exempelvis genom limning eller svetsning med värme eller ultraljud.

Absorptionskroppen 12 kan vara av vilket som helst konventionellt slag. Exempel på vanligen förekommande absorptionsmaterial är cellulosafluffmassa, tissueskikt, högabsorberande polymerer (s k superabsorbenter), absorberande skummaterial, absorberande nonwovenmaterial och liknande. Det är vanligt att kombinera cellulosafluffmassa med superabsorbenter i en absorptionskropp. Det är även vanligt med absorptionskroppar uppbyggda av skikt av olika material med olika egenskaper vad gäller vätskemottagningsförmåga, spridningsförmåga och lagringsförmåga. Detta är välkänt för fackmannen inom området och behöver därför inte beskrivas i detalj. De tunna absorptionskroppar som idag är vanliga i exempelvis barnblöjor och inkontinensskydd består ofta av en komprimerad, blandad eller skiktad struktur av cellulosafluffmassa och superabsorbent.

På utsidan av det vätsketäta ytskiktet 11 är ett fastsättningsorgan 14 i form av ett längsgående område av självhäftande lim anordnat. Limområdet 14 är lämpligen innan användning täckt med ett på ritningen ej visat löstagbart skyddsskikt av släppmedelsbehandlat papper eller plastfilm. På det visade inkontinensskyddet består fastsättningsorganet 14 av ett längsgående limområde men en

rad andra limmönster är naturligtvis tänkbara, liksom andra typer av fastsättningsorgan såsom kardborreytor, tryckknappar, gördlar, särskilda underbyxor, eller liknande.

Ett inkontinensskydd 10 av det i figur 8 visade slaget är i första hand avsett att användas av personer med förhållandevis lindriga inkontinensbesvär och ryms lätt inuti ett par vanliga underbyxor. Fastsättningsorganet 14 tjänar därvid till att hålla inkontinensskyddet på plats i underbyxorna under användningen.

Inkontinensskyddet 10 är timglasformat med bredare ändpartier 15,16 och ett smalare grenparti 17 beläget mellan ändpartierna 15,16. Grenpartiet 17 är det parti av inkontinensskyddet som är avsett att under användning vara anbragt i användarens gren och tjäna som mottagningsyta för den utsöndrade kroppsvätskan.

Mellan det vätskegenomsläppliga ytskiktet 2 och absorptionskroppen 11 är, såsom tidigare omtalats, anordnat ett poröst och spänstigt vätskeöverföringsskikt 3, exempelvis en fibervadd, ett poröst skummskikt, eller något annat av de material som angivits som lämpliga för det andra materialskiktet i det i figurerna 1 och 2 visade materiallaminatet. Vätskeöverföringsskiktet 3 tar emot den vätska som passerar genom ytskiktet 2. Vid urinering rör det sig ofta om förhållandevis stora mängder vätska som avges under kort tid. Det är därför väsentligt att kontakten mellan det vätskegenomsläppliga ytskiktet och det innanförliggande vätskeöverföringsskiktet 3 är sådan att vätskan snabbt tränger in i vätskeöverföringsskiktet 3. Genom att vätskeöverföringsskiktet är ett skikt med hög bulk och en tjocklek som företrädesvis är från 0.5 mm - 4 mm, kan skiktet 3 fungera som en tillfällig reservoir för

vätskan innan den efter hand absorberas in i absorptionskroppen 11.

I det visade exemplet är vätskeöverföringsskiktet 3 något smalare än absorptionskroppen 11, men sträcker sig i hela inkontinensskyddets längd. Ett sådant utförande är fördelaktigt eftersom det medger en viss materialbesparing. Det är naturligtvis möjligt att spara ytterligare material genom att inte låta vätskeöverföringsskiktet 3 sträcka sig i hela inkontinensskyddets längd. Exempelvis är det tänkbart att endast anordna vätskeöverföringsskiktet 3 vid inkontinensskyddets grenparti 17, eftersom huvudparten av den kroppsvätska som skall absorberas av inkontinensskyddet kan förväntas träffa skyddet inom detta parti 17.

Vanligen använda vätskeöverföringsskikt är ofta mycket porösa och uppvisar därmed en relativt stor effektiv medelporstorlek vilken ofta är större än den effektiva medelporstorleken hos konventionella vätskegenomsläppliga ytskiktsmaterial. Det effektiva medelporstorleken hos ett fibermaterial kan mätas enligt en mätmetod som beskrivs i EP-A-0,470,392. Eftersom vätska av kapillärverkan strävar efter att gå från grövre till finare kapillärer och ej tvärtom, tenderar vätska att stanna kvar i ytmaterialets fibernätverk istället för att dräneras av det porösare vätskeöverföringsskiktet. Detta innebär att vätska riskerar att rinna på ytskiktets yta och ge upphov till läckage. Dessutom stannar vätska kvar i ytskiktets fiberstruktur, varigenom ytskiktets yta upplevs som våt och obehaglig av användaren.

Genom att förbinda det vätskegenomsläppliga ytskiktet 2 med vätskeöverföringsskiktet 3, såsom beskrivits i samband med det i figur 1 och 2 visase materiallaminatet 1, erhålls en komprimering av vätskeöverföringsskiktet 3 vid bindningsställena 4. Vätskeöverföringsskiktet 3 uppvisar

därigenom en densitetsgradient med ökande densitet in mot respektive bindningsställe 4. Vätskeöverföringsskiktet 3 kommer härmed att uppvisa en porstorleksgradient kring bindningsställena 4 och ett område där den effektiva medelporstorleken är mindre än det vätskegenomsläppliga ytskiktets 2 medelporstorlek. Genom att gruppera bindningsställena 4 i enlighet med uppfinningen, är det möjligt att öka den del av ytskiktslaminatets 1 yta vid vilken medelporstorleken för vätskeöverföringsskiktet 3 är mindre än medelporstorleken för det vätskegenomsläppliga ytskiktet 2.

Vätskeöverföringsskiktet 3 kan härigenom effektivt dränera ytskiktet 2 på vätska. Genom att ytskiktet 2 dräneras på vätska i området kring respektive bindningsställe 4 och i de mellanliggande, tätare områdena 6 mellan bindningsställena 4 i varje grupp 5 av bindningsställen, uppstår i dessa områden ett underskott på vätska, varvid en vätskeutjämning kommer att ske med omkringliggande områden. Ytskiktet 2 kommer därmed totalt att innehålla mindre vätska och därigenom upplevas som torrare mot huden.

Genom att arrangera bindningsställena 4 i grupper 5 med bindningsfria, förtätade områden 6 mellan bindningsställena 4, är det således möjligt att med ett förhållandevis litet antal bindningar erhålla mycket god vätsketransport från det vätskegenomsläppliga ytskiktet 2 till vätskeöverföringsskiktet 3. Vidare lämnas bindningsfria områden 7 mellan grupperna 5, vilket ger inkontinensskyddets 10 mot användaren vända yta en vågig struktur. Dessutom är de bindningsfria områdena 7 mellan bindningsgrupperna 5 bulkiga och mjuka och medför att materiallaminatet 1 blir luftigt och komfortabelt, samt ger god distansverkan varigenom användarens hud kan hållas torr även efter vätning.

För att erhålla god vätskeöverföring mellan vätskeöverföringsskiktet 3 och absorptionskroppen 11, bör absorptionskroppen ha större vätskeaffinitet än vätskeöverföringsskiktet 3. Detta kan exempelvis åstadkommas genom att vätskeöverföringsskiktet 3 är mindre hydrofilt än absorptionskroppen 11 och/eller genom att absorptionskroppen 11 har en mer finkapillär struktur än vätskeöverföringsskiktet 3.

Uppfinningen skall inte anses vara begränsad till de här beskrivna utföringsexemplen, utan en rad ytterligare varianter och modifikationer är tänkbara inom ramen för de efterföljande patentkraven.

PATENTKRAV:

1. Ett materiallaminat (1) med en planutsträckning och en tjockleksled vinkelrätt mot planutsträckningen, innefattande ett första vätskegenomsläppligt fibröst materialskikt (2) och ett andra vätskegenomsläppligt, poröst och spänstigt materialskikt (3), varvid åtminstone ett av materialskikten (2,3) innefattar termoplastiskt material och de båda materialskikten (2,3) är inbördes förbundna genom att materiallaminatet (1) uppvisar bindningsställen (4) inom vilka det termoplastiska materialet bringats att åtminstone delvis mjukna eller smälta och därigenom sammanbinda de båda materialskikten (2,3), k ä n n e t e c k n a t av att bindningsområdena sträcker sig i materiallaminatets (1) tjockleksled genom det första materialskiktet (2) och åtminstone genom en del av det andra materialskiktet (3) och är anordnade i två eller flera grupper (5) med minst två bindningsställen (4) i varje grupp (5) varvid det största inbördes avståndet mellan två invid varandra belägna bindningsställen (4) i en viss grupp (5) är mindre än det minsta avståndet mellan gruppen (5) och dess närmast belägna granngrupp (5), varigenom materiallaminatet (1) uppvisar bindningsfria områden (6) mellan bindningställena (4) inom varje bindningsgrupp (5) vilka har högre densitet än bindningsfria områden (9) av materiallaminatet vilka är belägna mellan bindningsgrupperna (5).

2. Ett materiallaminat enligt krav 1, k ä n n e t e c k n a t av att bindningsställena (4) innefattar punktbindningar.

3. Ett materiallaminat enligt krav 1 eller 2, k ä n n e t e c k n a t av att bindningsställena (4) innefattar bindningslinjer.

4. Ett materiallaminat enligt krav 1, 2 eller 3,

k ä n n e t e c k n a t av att bindningsställena (4) innefattar rektangulära bindningar.

5. Ett materiallaminat enligt något av kraven 1-4, k ä n n e t e c k n a t av att bindningsställena innefattar cirkulära bindningar.

6. Ett materiallaminat enligt något av föregående krav, k ä n n e t e c k n a t av att det första materialskiktet (2) uppvisar genomgående hål inom bindningsställena (4).

7. Ett materiallaminat enligt något av föregående krav, k ä n n e t e c k n a t av att det första materialskiktet (2) utgörs av ett nonwovenmaterial.

8. Ett materiallaminat enligt krav 7, k ä n n e t e c k n a t av att nonwovenmaterialet är ett kardat, termobundet material.

9. Ett materiallaminat enligt något av föregående krav, k ä n n e t e c k n a t av att det andra materialskiktet (3) är ett fibervaddskikt med en tjocklek av 0,5-4 mm.

10. Ett materiallaminat enligt något av föregående krav, k ä n n e t e c k n a t av att det minsta inbördes avståndet x mellan två invid varandra belägna grupper (5) av bindningsställen (4) är åtminstone dubbelt så stort som det största inbördes avståndet y mellan två invid varandra anordnade bindningsställen (4) inom grupperna (5).

11. Ett materiallaminat enligt krav 10, k ä n n e t e c k n a t av att förhållandet x/y mellan avstånden x och y är från 2/1 till 12/1.

12. Ett materiallaminat enligt krav 10 eller 11, k ä n n e t e c k n a t av att x är 2-6 mm och y är 0,5-1 mm.

13. Ett absorberande alster innefattande ett vätskegenomsläppligt ytskikt (2), ett vätsketätt ytskikt (11) och en absorptionskropp (12) innesluten mellan de båda ytskikten (2,11), samt ett vätskegenomsläppligt vätskeöverföringsskikt (3) anordnat mellan det vätskegenomsläppliga ytskiktet (2) och absorptionskroppen (12), k ä n n e t e c k n a t av att det vätskegenomsläppliga ytskiktet (2) och det vätskegenomsläppgliga vätskeöverföringsskiktet (3) föreligger i form av ett materiallaminat i enlighet med något av föregående patentkrav.

SAMMANDRAG

Uppfinningen avser ett materiallaminat (1) med en planutsträckning och en tjockleksled vinkelrätt mot planutsträckningen, innefattande ett första vätskegenomsläppligt fibröst materialskikt (2) och ett andra vätskegenomsläppligt, poröst och spänstigt materialskikt (3), varvid åtminstone ett av materialskikten (2,3) innefattar termoplastiskt material och de båda materialskikten (2,3) är inbördes förbundna genom att materiallaminatet (1) uppvisar bindningsställen (4) inom vilka det termoplastiska materialet bringats att åtminstone delvis mjukna eller smälta och därigenom sammanbinda de båda materialskikten (2,3). Bindningsområdena är anordnade i två eller flera grupper (5) med minst två bindningsställen (4) i varje grupp (5), varvid det största inbördes avståndet mellan två invid varandra belägna bindningsställen (4) i en viss grupp (5) är mindre än det minsta avståndet mellan gruppen (5) och dess närmast belägna granngrupp (5), varigenom materiallaminatet (1) uppvisar bindningsfria områden (6) mellan bindningställena (4) inom varje bindningsgrupp (5) vilka har högre densitet än bindningsfria områden (9) av materiallaminatet vilka är belägna mellan bindningsgrupperna (5).

(Fig. 1)

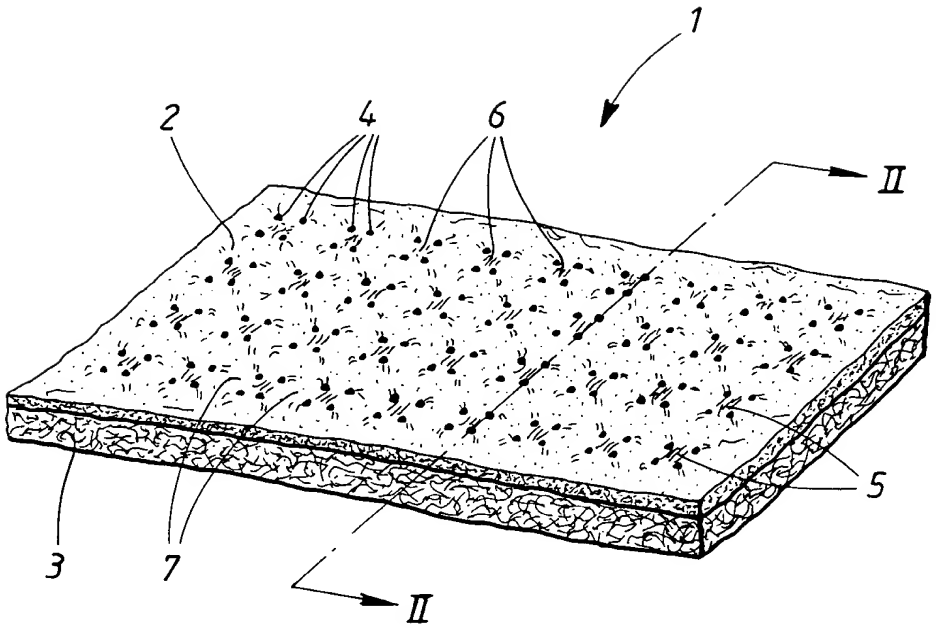

FIG. 1

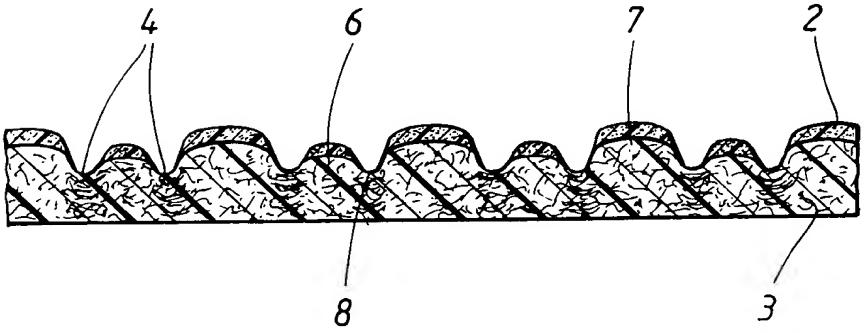

FIG. 2

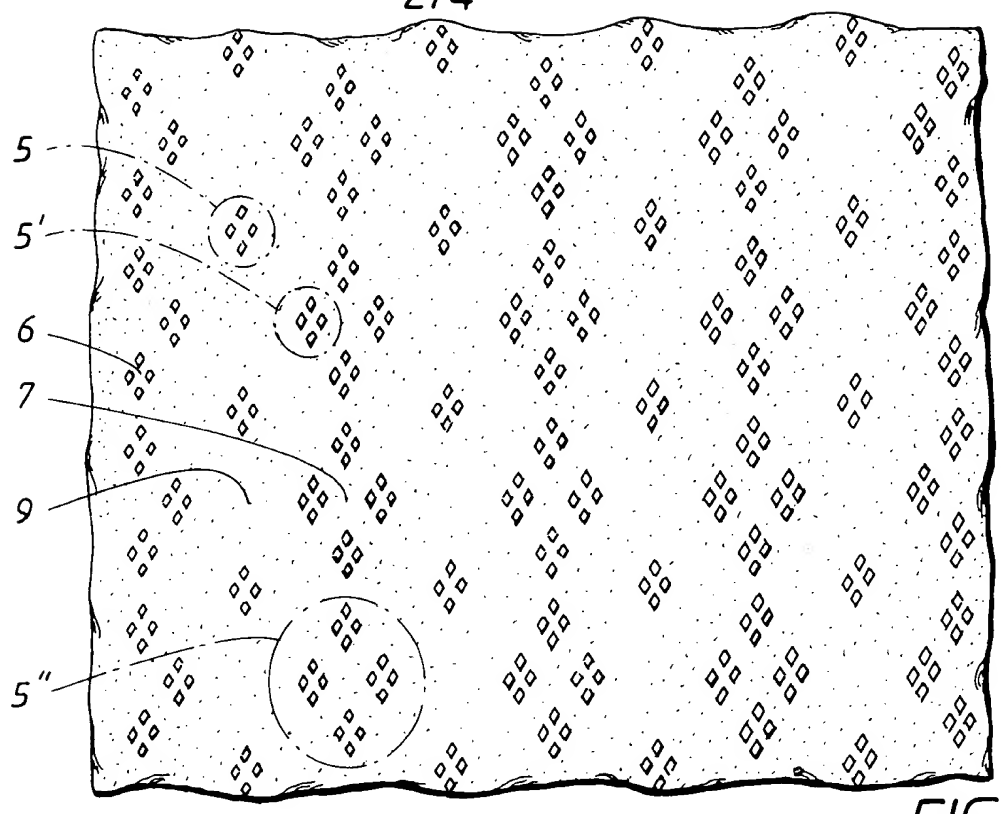

FIG.3

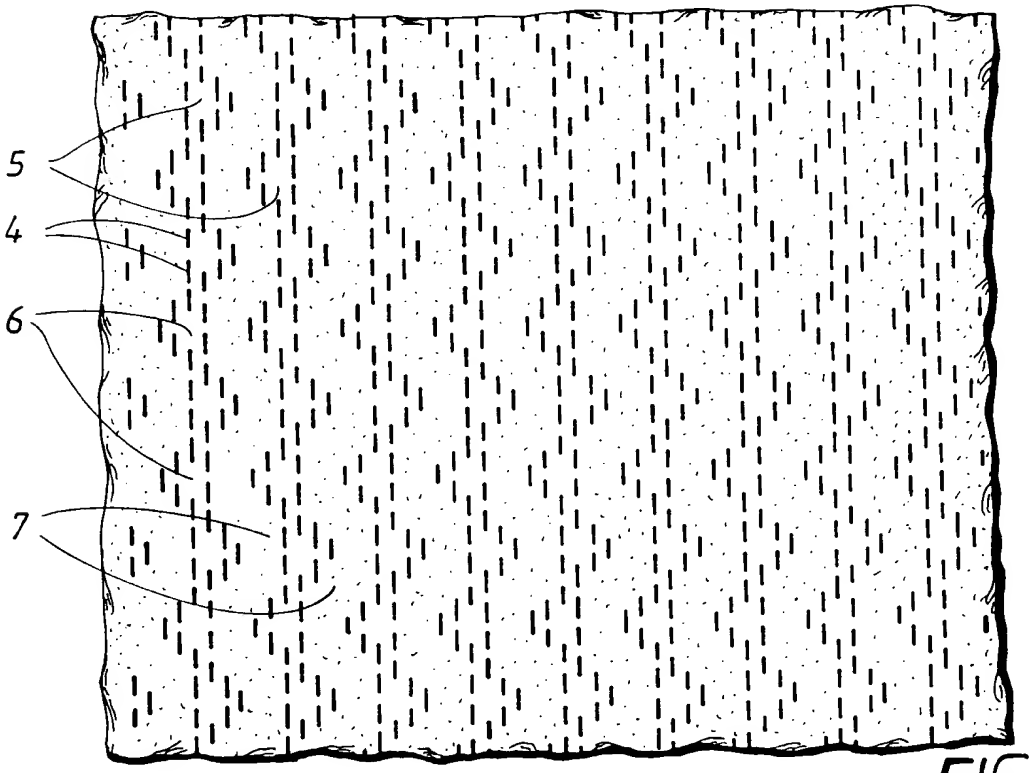

FIG.4

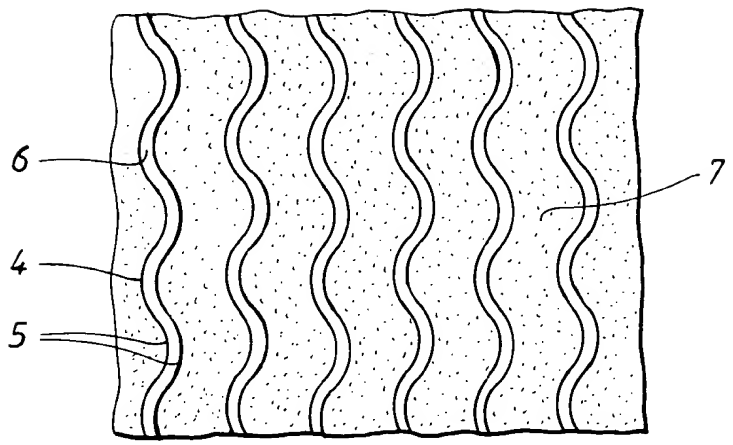

FIG.5

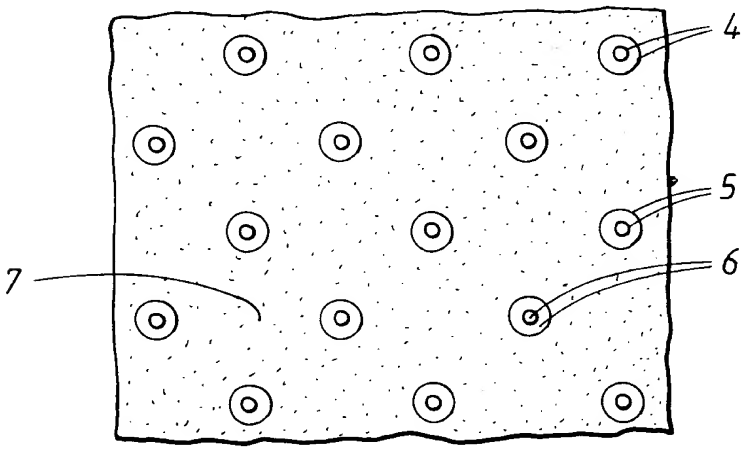

FIG.6

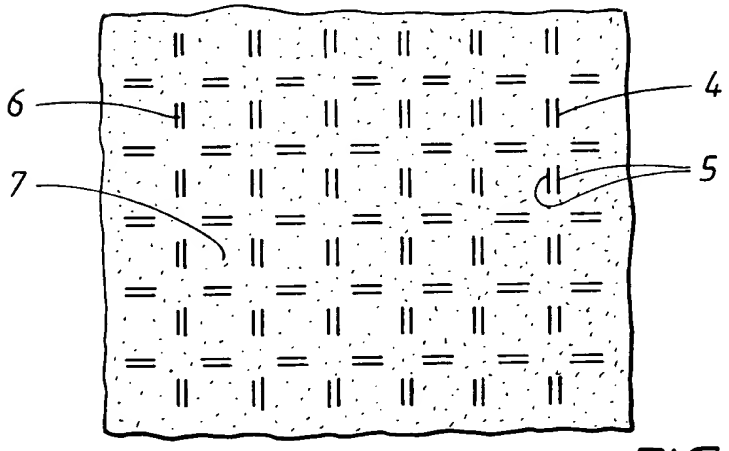

FIG.7

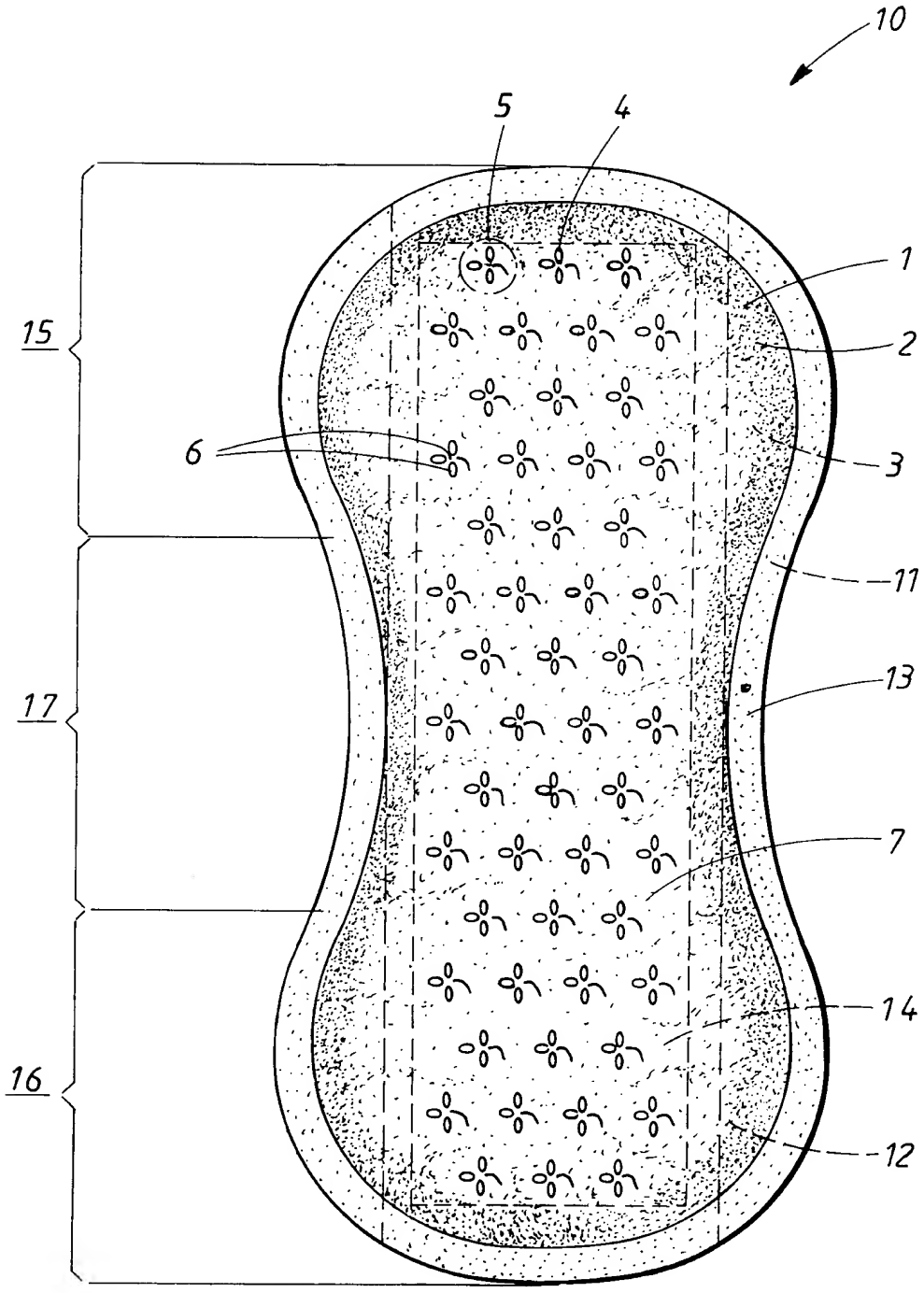

FIG. 8

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(71) Applicant *(for all designated States except US)*: SCA HYGIENE PRODUCTS AB [SE/SE]; S-405 03 Göteborg (SE).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: HEDENBERG, Peter [SE/SE]; Marklandsgatan 61, S-414 77 Göteborg (SE). HANSSON, Roy [SE/SE]; Ålegårdsgatan 112, S-431 50 Mölndal (SE). TENNBY, Anders [SE/SE]; Lagmansgatan 20 C, S-416 53 Göteborg (SE). ELFSTRÖM, Anna-Carin [SE/SE]; Krossholmsvägen 1074, S-423 38 Torslanda (SE). KROOK, Fredrik [SE/SE]; Schaktmästaregatan 7, S-412 61 Göteborg (SE). GUSTAFSSON, Anders [SE/SE]; Koferdalsvägen, P.O. Box 5181, S-427 35 Billdal (SE).

(74) Agents: GRAUDUMS, Valdis et al.; Albihns Patentbyrå Göteborg AB, P.O. Box 142, S-401 22 Göteborg (SE).

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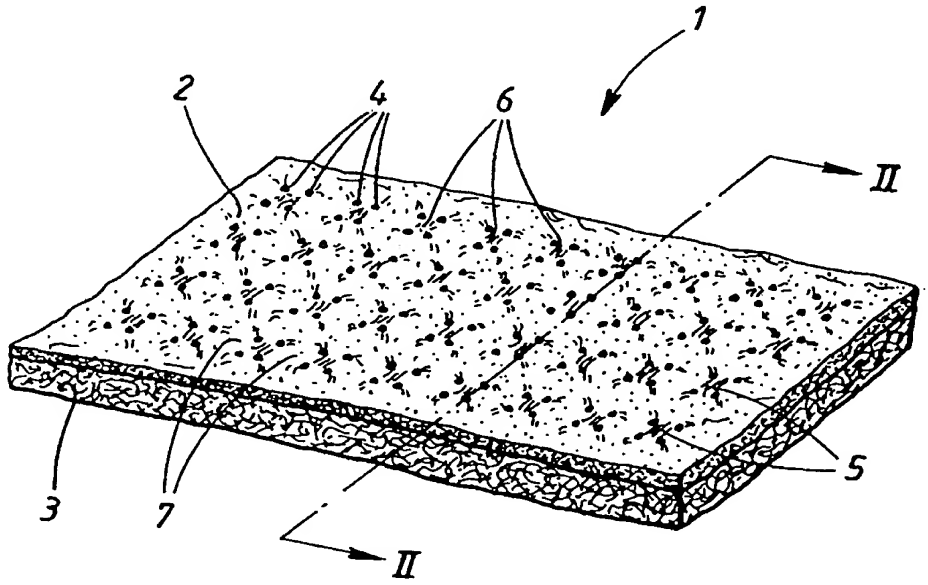
(57) Abstract

The invention relates to a material laminate (1) with a planar dimension and a thickness direction perpendicular to the planar dimension, including a first liquid-permeable fibrous material layer (2) and a second liquid-permeable, porous and resilient material layer (3), with at least one of the material layers (2, 3) including thermoplastic material and the two material layers (2, 3) being mutually connected by the material laminate (1) exhibiting bonding sites (4) within which the thermoplastic material has been caused to at least partially soften or melt and thereby bond together the two material layers (2, 3). The bonding areas are arranged in two or more groups (5) with at least two bonding sites (4) in each group (5), with the greatest relative distance between two bonding sites (4), which are situated adjacent to each other, in a particular group (5) being less than the shortest distance between the group (5) and its closest adjacent group (5), as a result of which the material laminate (1) exhibits bond-free areas (6) between the bonding sites (4) within each bonding group (5) which have a higher density than bond-free areas (9) of the material laminate which are situated between the bonding groups (5).



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TITLE:

MATERIAL LAMINATE FOR USE AS AN OUTER LAYER ON ABSORBENT PRODUCTS

TECHNICAL FIELD:

The invention relates to a material laminate for use as an outer layer on absorbent products such as nappies, panty nappies, incontinence shields, sanitary towels, bandages or the like. The material laminate exhibits a planar dimension and a thickness direction perpendicular to the planar dimension and includes a first liquid-permeable fibrous material layer and a second liquid-permeable, porous and resilient material layer, with at least one of the material layers including thermoplastic material and the two material layers being mutually connected by the material laminate exhibiting bonding sites within which the thermoplastic material has been caused to at least partially soften or melt and thereby bond the two material layers together. The invention also relates to an absorbent product which includes the material laminate.

BACKGROUND:

Absorbent products which are intended for single use normally exhibit a liquid-permeable outer layer which faces the body of the user when the product is used. Such an outer layer often consists of a nonwoven material, i.e. a fibre material in which the fibres included in it have been bound together in some other way than by means of weaving.

It is also known to arrange a liquid-transferring layer between the outer layer and an absorptive body which is included in the product. Such a liquid-transferring layer should have the ability to receive large quantities of liquid rapidly and spread the liquid and temporarily store it before it is absorbed by the underlying absorptive body. This is of great

importance, especially in the case of today's thin, compressed absorptive bodies, which often have a high content of so-called superabsorbents. While such materials have a high absorptive capacity, they in many cases exhibit a rate of admission which is too low for managing instantaneously to absorb the large quantity of liquid which can be emitted over a few seconds in association with urination. A porous, relatively thick liquid-transferring layer, for example in the form of a fibre wad, a bound or unbound carded fibre layer, or some other type of fibre material, has a high capacity for receiving liquid instantaneously and can temporarily store the liquid until the absorptive body has had time to absorb it. This situation also applies to porous foam material. In order for the absorbent product to be able to receive repeated volumes of liquid, it is necessary for the liquid-transferring layer essentially to have time to be emptied of liquid between each wetting. In this connection, the porous structure of the liquid-transferring layer expediently interacts with a more compact and/or more hydrophilic absorptive body.

Examples of absorbent products which contain porous liquid-transferring layers are to be found in US-A-3,371,667, EP-A-0,312,118, EP-A-0,474,777, EP-A-685,214 and WO 97/02133.

A problem associated with the absorbent products which have been described is that the liquid-permeable outer layer materials often exhibit an effective median pore size which is less than the median pore size of the underlying recipient layer. In order to improve the liquid transfer between the outer layer and the liquid-transferring layer, EP-A-685,214 and WO 97/01233 have proposed that the two layers be bound to each other by the layers being melted together in a bonding pattern in the form of points or lines. However, a disadvantage of arranging a large number of bonds at a short distance from each other is that the surface material laminate loses volume and, as a result, pliancy and kindness to the skin. Furthermore, the bonds result in the material laminate becoming relatively stiff and, for this reason as well, less comfortable to wear in contact with the skin. As a result of the bonds decreasing the volume of the laminate, i.e. its thickness, the distance between the absorptive body of the product

and the body of the user also decreases. This thereby increases the risk of liquid penetrating back out of the product and wetting the body of the user.

There thus remains a need for an improved surface material which exhibits good liquid-transferring ability and low rewetting and, at the same time, a high degree of pliancy, kindness to the skin and flexibility.

BRIEF DESCRIPTION OF THE INVENTION:

The present invention provides a material laminate of the type specified in the introduction. The material laminate according to the invention is primarily distinguished by the fact that the bonding sites extend in the thickness direction of the material laminate, through the first material layer and at least through a part of the second material layer, and are arranged in two or more groups with at least two bonding sites in each group, with the greatest relative distance between two bonding sites which are located close to each other in a particular group being less than the shortest distance between the group and the neighbouring group which is located closest to it, as a result of which the material laminate exhibits bond-free areas between the bonding sites within each bonding group which have a higher density than bond-free areas of the material laminate which are located between the bonding groups.

Further distinctive features and embodiments are evident from the subsequent patent claims.

By means of arranging the bonds, in accordance with the invention, in a pattern which produces, from the bonds, limited areas of higher fibre density alternating with areas of lower fibre density, a material laminate which is of high bulk, pliancy and flexibility is obtained, at the same time as its ability to transfer liquid and its ability to store liquid temporarily are very good. In addition, a material laminate according to the invention is very airy and pleasant to wear against the skin and exhibits low rewetting.

BRIEF DESCRIPTION OF THE FIGURES:

In that which follows, the invention will be described in more detail with reference to the figures which are shown on the attached drawings.

In this connection:

Figure 1 shows a plane view of a material laminate according to the invention,

Figure 2 shows a section along the line II-II through the material laminate in Figure 1,

Figure 3 shows a first bonding pattern,

Figure 4 shows a second bonding pattern,

Figure 5 shows a third bonding pattern,

Figure 6 shows a fourth bonding pattern,

Figure 7 shows a fifth bonding pattern, and

Figure 8 shows an incontinence shield with a material laminate according to the invention.

DESCRIPTION OF EMBODIMENTS:

The material laminate 1 shown in Figures 1 and 2 includes a first material layer 2 and a second material layer 3. In this connection, the first material layer 2 expediently consists of a relatively thin nonwoven material.

Nonwoven materials can be produced by many different methods, for example by carding or spinning a fibre pile which is then

bound. Furthermore, use can be made of the melt-blown technique in order to deposit short fibres in the form of a fibre mat. A number of different methods exist for binding the fibres in a nonwoven material. For example, different types of binding agent can be used. Furthermore, heat-meltable components in the material can be exploited for binding by means of ultrasound or by means of supplying heat. Other binding methods are needling and hydroentangling. Moreover, different binding methods can be combined with each other.

Since the material laminate is used as a liquid-permeable surface material on an absorbent product, the first material layer 2 is the layer which is intended to be facing a user of the product. In this connection, it is important that the surface of the first layer which is facing the user is smooth and soft.

The second material layer 3 is advantageously thicker than the first material layer 2 and consists of a porous, resilient fibre material having a thickness of 0.5-4 mm. The second material layer 3 serves as a liquid-transferring layer when the material laminate is arranged, as a surface material, on an absorbent product. In this connection, the second material layer 3 should have the ability to receive large quantities of liquid over a short period, spread the liquid in the plane of the material layer, convey the liquid onward to an absorptive body which is arranged under the material laminate 1 and, in addition, also be able temporarily to store liquid which the absorptive body has not had time to absorb.

Materials which are particularly well suited for use in the second material layer are synthetic fibre wads, carded fibre layers which are bound or unbound, or bulky nonwoven materials. A special type of fibre material which can be used is tow, which is understood to mean fibres which are in the main parallel, long or infinite, or fibre filaments which are present in the form of layers or strands. Porous, hydrophilic foam materials are another type of suitable material. The second material layer can furthermore consist of two or more layers of different materials or of the same type of material.

A composite nonwoven material, consisting of a first material

layer 2 composed of a nonwoven material of synthetic fibres having a grammage of between 10 and 50 g/m^2 and a second material layer 3 composed of a wad of synthetic fibres having a grammage of between 20 and 100 g/m^2, may be mentioned as an example, which is in no way limiting, of a material laminate according to the invention. At least the first material layer 2, and preferably both the layers 2, 3, include thermoplastic material. Suitable thermoplastic materials are polyolefins such as polyethylene and polypropene, and polyamides, polyesters and the like. Different types of so-called bicomponent fibres can also be used.

The two material layers 2, 3 are connected to each other by a large number of bonding sites 4. In this connection, the bonding sites 4 are virtually punctate and have been formed by simultaneously compressing the material laminate 1 and supplying energy to it. This has caused the thermoplastic material to soften or melt at the bonding sites 4 and thereby bond together the two layers 2, 3 which are included in the material laminate 1. The bonding together of the first and second material layers 2, 3 is expediently performed by means of heat bonding or by means of ultrasound bonding. The bonding sites 4 are arranged in groups 5 with four bonding sites 4 in each group 5. In this case, the four bonds are located so that they form the corners of a square. The relative distance between the bonding sites 4 in each group is less than the relative distance between the groups 5. In this context, the distances within the groups 5 are determined as being the shortest distance between the bonding sites 4 which are lying adjacent to each other. In a corresponding manner, the distance between the groups 5 is determined as being the shortest distance between groups 5 which are lying adjacent to each other. In both cases, the distances are measured from the edges of the bonding sites 4. The shortest distance between adjacent groups, as measured between the bonding sites 4, in each respective group 5, which are located closest to each other, is preferably 2-6 mm, and the greatest distance between the bonding sites 4 which are located adjacent to each other within the groups is preferably 0.5-1 mm. The former distance is then at least approx. twice as great as the latter distance.

When the melted or softened thermoplastic material in the laminate 1 cools, it solidifies and serves as a bonding agent for the material laminate. In addition to the bonding together of the two material layers 2, 3, a permanent compaction or condensation of the porous structure in the material layers 2, 3 is obtained in this manner. That which is most apparent is the compaction at the actual bonding sites 4. In addition, the particular location of the bonding sites 4 results in the bonded material laminate 1 exhibiting square areas 6 which are enclosed by the bonding site 4 in the groups 5 and which exhibit a higher degree of compaction than do the areas 7 between the groups 5.

The material laminate 1 shown in Figures 1 and 2 is bonded together in such a manner that through-holes 8 have been formed in the first material layer 2 at the bonding sites 4. In addition, the material within and immediately around the bonding sites 4 is strongly compacted, with finer capillaries than the surrounding material. This results in the bonding sites constituting areas which have an increased ability to allow liquid from the first material layer 2 to pass through into the second material 3.

Even if the material laminate 1 is shown with through-holes 8 in the first material layer 2, such a design is not necessary for the invention. Thus, material laminates in which the bonding sites 4 exhibit a surface of a more or less liquid-impermeable nature, or material laminates having both through-holes and liquid-impermeable bonds, are also encompassed. Bonding sites exhibiting low or no liquid permeability are obtained, for example, if the material laminate contains a high proportion of thermoplastic material which has been melted and then allowed to solidify to form a film-like surface. Even if the actual bonding sites 4 are themselves almost completely liquid-impermeable, the compacted fibre structure which has arisen around the bonding sites 4 due to the compression which takes place in connection with the bonding results in the area immediately around each bonding site 4 nevertheless exhibiting a very high ability to transfer liquid.

Furthermore, the compacted areas 6 inside the bonding sites 4 in each group 5 of bonding sites constitute zones possessing an increased

ability to transfer liquid. Due to the fact that the distance between the bonding sites 4 within each group 5 is relatively small and preferably from 0.5 mm to 1 mm, the compression in the bonding sites 4 results in the area 6 inside the bonding sites 4 also being affected such that a denser structure is obtained. Thus, the capillary size in the compacted areas 6 which are delimited by the bonding sites 4 is on average less than in areas of the material laminate 1 which are situated between the groups 5 of bonding sites 4. This means that the material laminate 1 exhibits an ability to transfer liquid which is very high in relation to the combined surface of the bonding sites 4. The combined bonded surface preferably constitutes 3-11% of the total surface. The surprisingly good ability to transport and transfer liquid is due to the fact that it is not only the bonding sites 4 themselves and the areas immediately adjacent to the bonding sites which exhibit an increased ability to transfer liquid; the areas which are located between the bonding sites 4 in a group 5 also contribute to the improved liquid transfer.

It is thus possible, by means of the invention, to create areas of greater density and, as a result, increased ability to transport liquid but nevertheless retain high bulk, pliancy and flexibility in the material laminate 1.

Figure 3 shows a bonding pattern for a material laminate 1 according to the invention. The bonding pattern consists of rhombic bonding sites 4 arranged in groups 5' of four bonding sites 4 in each group 5'. In addition, the bonding pattern in Figure 3 exhibits superordinate group formations 5" of four groups 5' having in each case four bonding sites 4. Three different types of areas 6, 7, 9, with different relative material densities, can thus be identified in the bonding pattern in Figure 3. In this case, the densest material structure, with the smallest pore size, is to be found within the groups 5' consisting of four bonding sites 4. The areas 7 of somewhat lower density, and as a result somewhat greater pore size, are to be found in the superordinate group formations 5" of groups 5' having in each case four bonding sites 4. Finally, the least dense areas 9 are to be found between the superordinate group formations 5" and

between the superordinate group formations 5" and individual groups 5 of bonding sites 4 which are arranged between the superordinate group formations 5".

Figure 4 shows bonding sites 4 in the form of short (1-1.5 mm) dash-shaped bonds which are arranged in what are in the main parallel bands 5 having a relative distance between the bands which exceeds the distance between the bonding sites 4 which are included in the bands. Within the bands, compacted areas 6 are present between the bonding sites 4, which compacted areas exhibit a smaller pore size than areas 7, which are located between the bands 5.

Further utilisable bonding patterns are shown in Figures 5-7, with Figure 5 showing undulating bonding lines 4 which are in the main parallel and which are arranged in pairs with a relative distance between the bonding lines 4 in each pair 5 which exceeds the distance between the pairs 5 of bonding lines 4. The bonding pattern shown in Figure 5 thus results in a material laminate having compacted liquid-transferring areas between the bonding lines 4 in each pair and bulky, distance-creating, soft and airy areas 7 between the bonding pairs 5.

An advantage of arranging the bonding sites 4 in the form of bands or lines is that a surface material having such a bonding pattern in the main conducts liquid in along the bands or lines and counteracts the spread of liquid perpendicularly to the bands or lines. This circumstance can advantageously be exploited in order to decrease the risk of an absorbent product leaking from its edges.

Figure 6 shows a pattern with groups 5 which each consist of two bonding sites 4 in the form of concentric rings which delimit compacted areas 6, while areas 7 of lower density are to be found outside the outer of the annular bonding sites 4.

Figure 7 shows a pattern of short parallel bonding lines 4 which are arranged in pairs at a relative distance such that compacted areas 6 are formed between the bonding lines 4 in each pair 5 and less dense areas are formed between the pairs of bonding lines 4.

The incontinence shield 10 shown in Figure 8 includes a

material laminate 1 according to the invention, which laminate includes a liquid-permeable outer layer 2 and a liquid-permeable liquid-transferring layer 3. Together with a liquid-impermeable outer layer 11, the liquid-permeable outer layer 2 encloses an absorptive body 12. The two outer layers 2, 11 have somewhat larger dimensions in the plane than does the absorptive body 12 and extend some distance beyond the edges of the absorptive body. The outer layers 2, 11 are mutually connected within the projecting parts 13, for example by gluing or welding with heat or ultrasound.

The absorptive body 12 can be of any conventional type whatever. Examples of commonly occurring absorptive materials are cellulose fluff pulp, tissue layers, highly absorbent polymers (so-called superabsorbents), absorbent foam materials, absorbent nonwoven materials and the like. It is normal to combine cellulose fluff pulp and superabsorbents in an absorptive body. It is also normal to use absorptive bodies which are constructed of layers of different materials having different properties as regards the ability to receive, spread and store liquid. This is well known to the skilled person in the field and does not therefore need to be described in detail. The thin absorptive bodies which are nowadays common in, for example, babies' nappies and incontinence shields often consist of a compressed, mixed or layered structure composed of cellulose fluff pulp and superabsorbent.

An attachment member 14, in the form of a longitudinal area of self-adhesive glue, is arranged on the outside of the liquid-impermeable outer layer 11. Before use, the glue area 14 is expediently covered with a detachable protective layer, which is not shown on the drawing, of release agent-treated paper or plastic film. While the attachment member 14 on the depicted incontinence shield consists of a longitudinal glue area, it is naturally possible to conceive of a number of other glue patterns as well as other types of attachment members such as hook-and-loop members, press studs, girdles, special underpants, or the like.

An incontinence shield 10 of the type shown in Figure 8 is first of all intended to be used by individuals who are suffering from relatively

mild incontinence problems and is readily accommodated inside a normal pair of underpants. In this connection, the attachment element 14 serves to hold the incontinence shield in place in the underpants during use.

The incontinence shield 10 is hourglass-shaped with wider end parts 15, 16 and a narrower crotch part 17 which is located between the end parts 15, 16. The crotch part 17 is that part of the incontinence shield which is intended, during use, to be to the crotch of the user and to serve as the surface for receiving the excreted body fluid.

As has been previously mentioned, a porous and resilient liquid-transferring layer 3, for example a fibre wad, a porous foam layer, or another of the materials which have been specified as being suitable for the second material layer in the material laminate shown in Figures 1 and 2, is arranged between the liquid-permeable outer layer 2 and the absorptive body 11. The liquid-transferring layer 3 receives the liquid which passes through the outer layer 2. Urination often involves relatively large quantities of liquid which are emitted over a short period. It is therefore essential that the contact between the liquid-permeable outer layer and the liquid-transferring layer 3 which lies inside it is such that the liquid penetrates rapidly into the liquid-transferring layer 3. Due to the fact that the liquid-transferring layer is a layer having a high bulk and a thickness which is preferably from 0.5 mm to 4 mm, the layer 3 can function as a temporary reservoir for the liquid before it is gradually absorbed into the absorptive body 11.

0.5-5mm

While the liquid-transferring layer 3 is somewhat narrower than the absorptive body 11 in the example shown, it extends over the whole length of the incontinence shield. Such a design is advantageous since it allows some saving of material. It is naturally possible to save further material by not allowing the liquid-transferring layer 3 to extend over the whole of the length of the incontinence shield. For example it is conceivable only to arrange the liquid-transferring layer 3 at the crotch part 17 of the incontinence shield since the majority of the body fluid which is to be absorbed by the incontinence shield can be expected to strike the shield within this part 17.

Commonly employed liquid-transferring layers are often very porous and thereby exhibit a relatively large effective median pore size which is often larger than the effective median pore size of conventional liquid-permeable surface layer materials. The effective median pore size of a fibre material can be measured using a measuring method which is described in EP-A-0,470,392. Since, as a result of the capillary effect, liquid endeavours to pass from wider to finer capillaries and not the other way round, liquid tends to remain in the fibre network of the surface material instead of being drained by the more porous liquid-transferring layer. This means that there is a risk of liquid running on the surface of the outer layer and giving rise to leakage. In addition, liquid remains in the fibre structure of the outer layer as a result of which the surface of the outer layer is felt by the user to be wet and uncomfortable.

Connecting the liquid-permeable outer layer 2 with the liquid-transferring layer 3 as described in connection with the material laminate 1 shown in Figures 1 and 2 results in the liquid-transferring layer 3 being compressed at the bonding site 4. In this way, the liquid-transferring layer 3 exhibits a density gradient, with the density increasing in the direction towards each respective bonding site 4. As a result, the liquid-transferring layer 3 comes to possess a pore size gradient around the bonding sites 4 and an area in which the effective median pore size is less than the median pore size of the liquid-permeable outer layer 2. By grouping the bonding sites 4 in accordance with the invention, it is possible to increase the proportion of the surface of the outer layer laminate 1 in which the median pore size of the liquid-transferring layer 3 is less than the median pore size of the liquid-permeable outer layer 2.

Because of this, the liquid-transferring layer 3 can efficiently drain the outer layer 2 of liquid. As a result of the outer layer 2 being drained of liquid in the area around each respective bonding site 4 and in the intermediate, denser areas 6 between the bonding sites 4 in each group 5 of bonding sites, a deficit of liquid arises in these areas, whereupon an equalisation of liquid will take place with surrounding areas. As a result, the outer layer 2 will come to contain less liquid overall and

thereby be felt to be drier against the skin.

By arranging the bonding sites 4 in groups 5 with bond-free, condensed areas 6 between the bonding sites 4, it is thus possible, with a relatively small number of bonds, to obtain very good liquid transport from the liquid-permeable outer layer 2 to the liquid-transferring layer 3. In addition, bond-free areas 7 are left between the groups 5, thereby imparting an undulating structure to the surface of the incontinence shield 10 which is facing the user. In addition, the bond-free areas 7 between the bonding groups 5 are bulky and soft and result in the material laminate 1 being airy and comfortable while at the same time providing a good distancing effect, as a result of which the skin of the user can be kept dry even after wetting.

In order to obtain good liquid transfer between the liquid-transferring layer 3 and the absorptive body 11, the absorptive body should have a greater liquid affinity than the liquid-transferring layer 3. This can be achieved, for example, by the liquid-transferring layer 3 being less hydrophilic than the absorptive body 11 and/or by the absorptive body 11 having more of a fine-capillary structure than the liquid-transferring layer 3.

The invention is not to be regarded as being limited to the embodiment examples which are described in this present document; on the contrary, it is possible to conceive of a number of further variants and modifications within the scope of the subsequent patent claims.

Patent claims:

1. A material laminate (1) with a planar dimension and a thickness direction perpendicular to the planar dimension, including a first liquid-permeable fibrous material layer (2) and a second liquid-permeable, porous and resilient material layer (3), with at least one of the material layers (2, 3) including thermoplastic material and the two material layers (2, 3) being mutually connected by the material laminate (1) exhibiting bonding sites (4) within which the thermoplastic material has been caused to at least partially soften or melt and thereby bond together the two material layers (2, 3), characterized in that the bonding areas extend in the thickness direction of the material laminate (1) through the first material layer (2) and at least through a part of the second material layer (3) and are arranged in two or more groups (5) with at least two bonding sites (4) in each group (5), with the greatest relative distance between two bonding sites (4), which are situated adjacent to each other, in a particular group (5) being less than the shortest distance between the group (5) and its closest adjacent group (5), as a result of which the material laminate (1) exhibits bond-free areas (6) between the bonding sites (4) within each bonding group (5) which have a higher density than bond-free areas (9) of the material laminate which are situated between the bonding groups (5).

2. A material laminate according to Claim 1, characterized in that the bonding sites (4) comprise point bonds.

3. A material laminate according to Claim 1 or 2, characterized in that the bonding sites (4) comprise bonding lines.

4. A material laminate according to Claim 1, 2 or 3, characterized in that the bonding sites (4) comprise rectangular bonds.

5. A material laminate according to any one of Claims 1-4, characterized in that the bonding sites comprise circular bonds.

6. A material laminate according to any one of the preceding claims, characterized in that the first material layer (2) exhibits through-holes within the bonding sites (4).

7. A material laminate according to any one of the preceding claims, characterized in that the first material layer (2) consists of a nonwoven material.

8. A material laminate according to Claim 7, characterized in that the nonwoven material is a carded, thermally bonded material.

9. A material laminate according to any one of the preceding claims, characterized in that the second material layer (3) is a fibre wad layer having a thickness of 0.5-4 mm.

10. A material laminate according to any one of the preceding claims, characterized in that the shortest relative distance x between two groups (5) of bonding sites (4), which two groups are situated adjacent to each other, is at least twice as great as the greatest relative distance y between two bonding sites (4) which are arranged adjacent to each other within the groups (5).

11. A material laminate according to Claim 10, characterized in that the ratio x/y between the distances x and y is from 2/1 to 12/1.

12. A material laminate according to Claim 10 or 11, characterized in that x is 2-6 mm and y is 0.5-11 mm.

13. An absorbent product including a liquid-permeable outer layer (2), a liquid-impermeable outer layer (11) and an absorptive body (12)

enclosed between the two outer layers (2, 11), and also a liquid-permeable liquid-transferring layer (3) arranged between the liquid-permeable outer layer (2) and the absorptive body (12), characterized in that the liquid-permeable outer layer (2) and the liquid-permeable liquid-transferring layer (3) are present in the form of a material laminate in accordance with any one of the preceding patent claims.

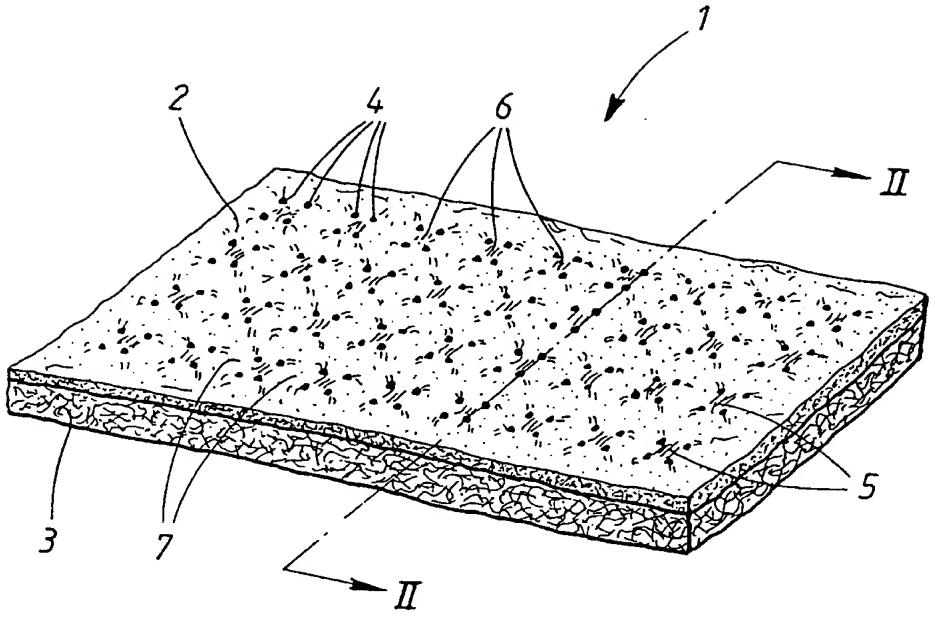

FIG. 1

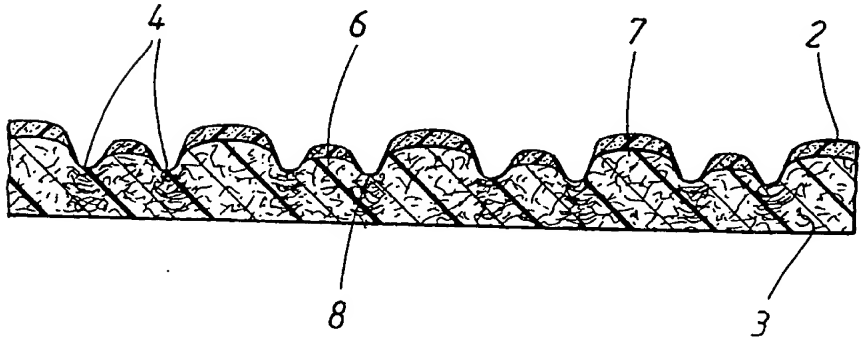

FIG. 2

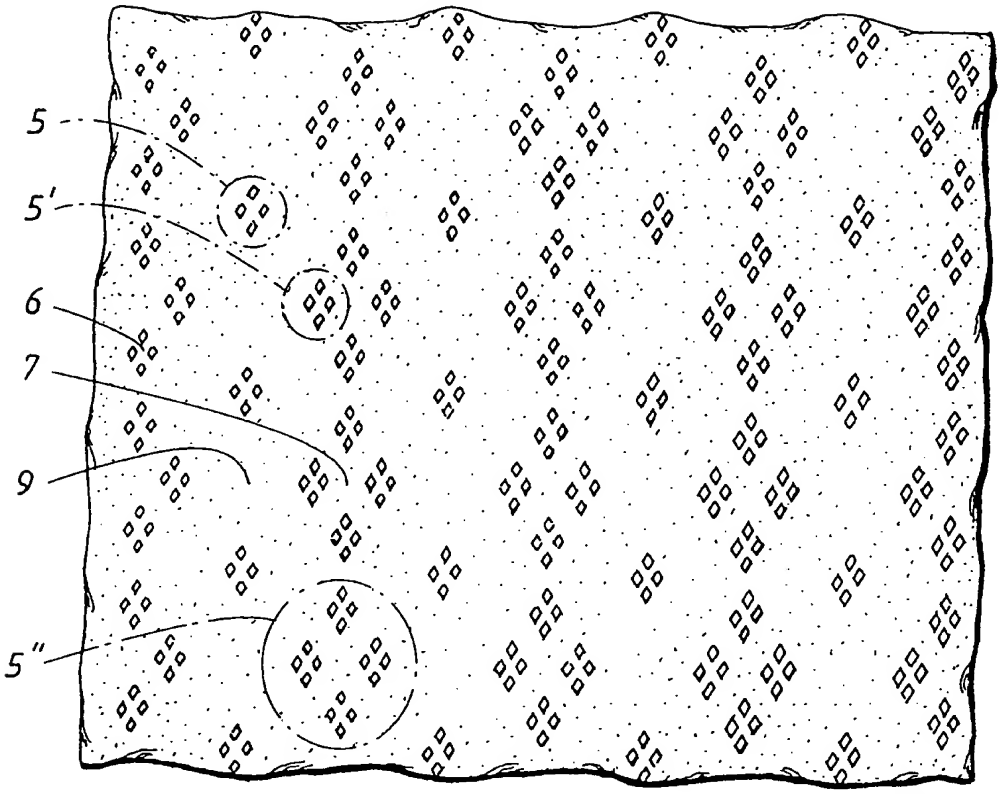

FIG. 3

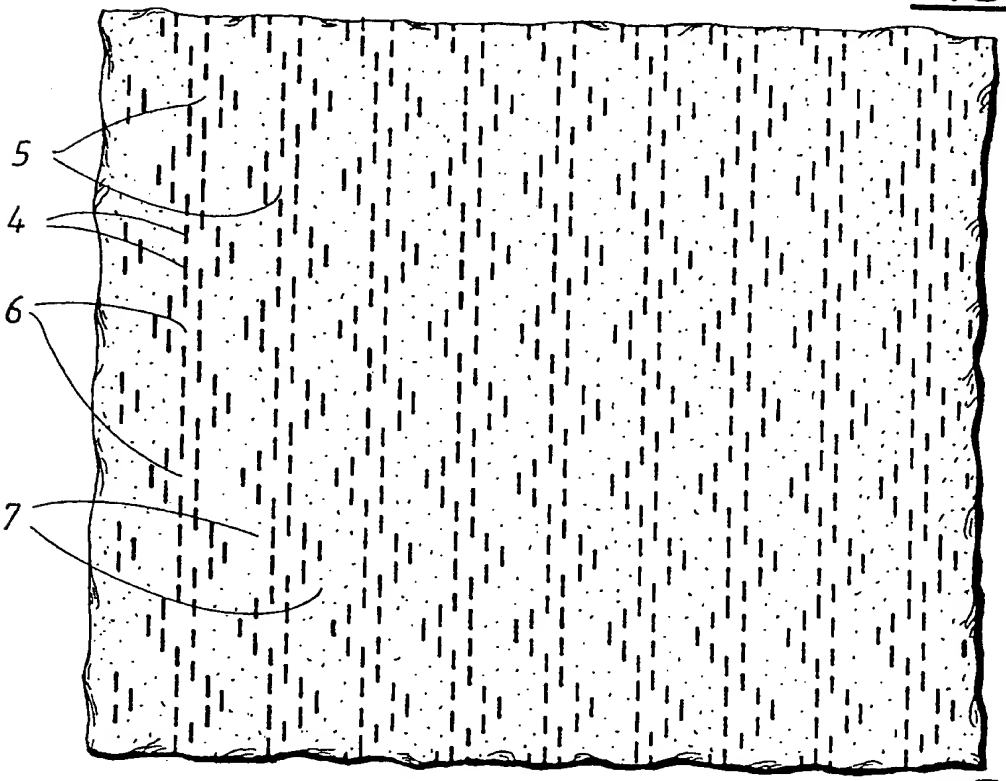

FIG. 4

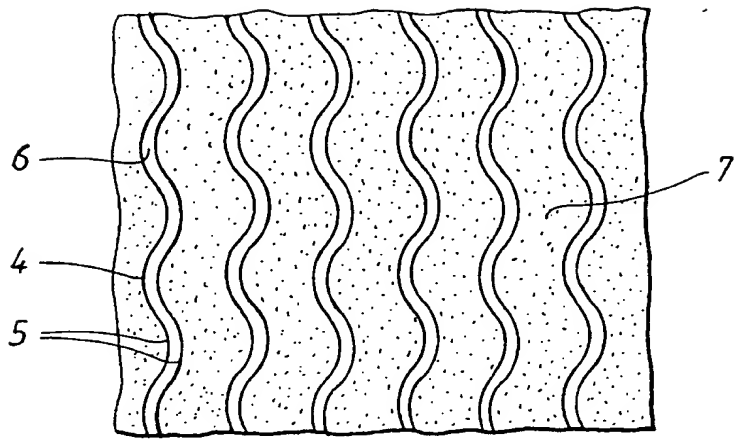

FIG.5

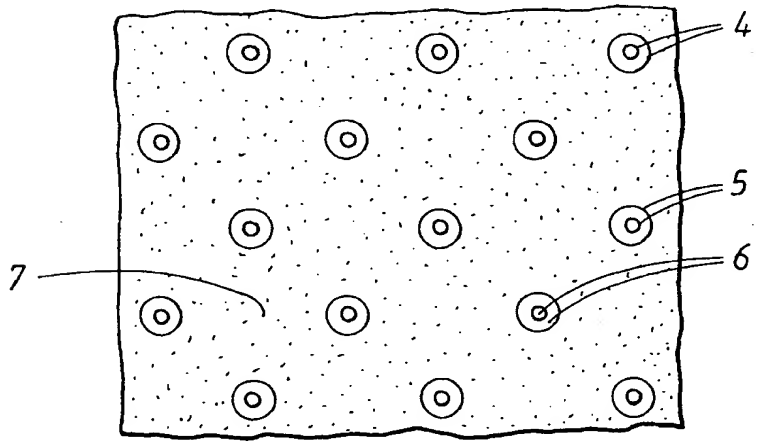

FIG.6

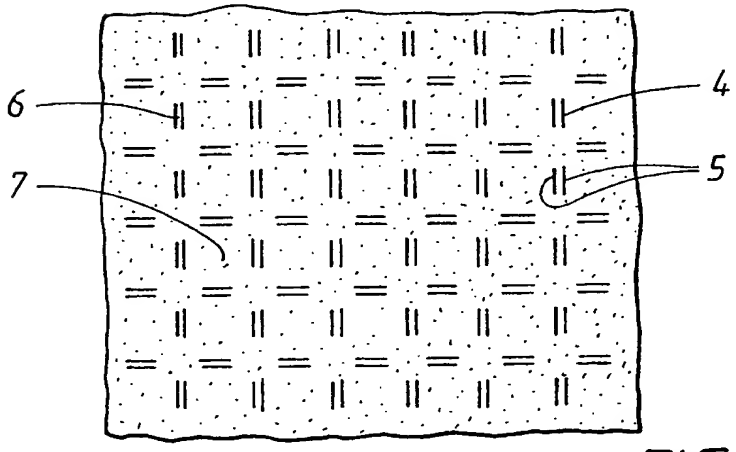

FIG.7

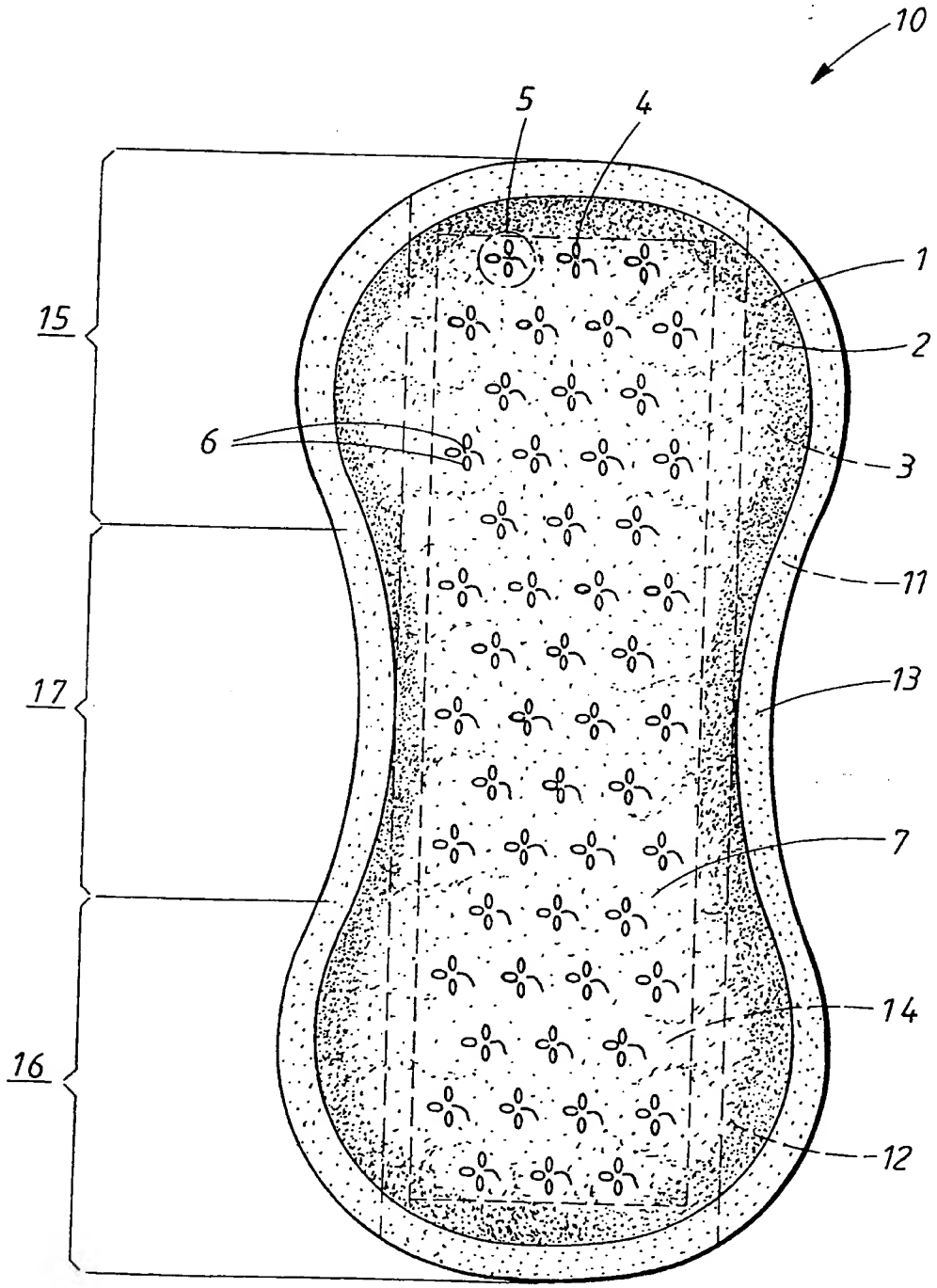

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/00407

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61F 13/15, A61F 13/50
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0685214 A2 (UNI-CHARM CORPORATION), 6 December 1995 (06.12.95), column 1, line 50 - column 2, line 8; column 3, line 35 - line 41	1-13
A	WO 9702133 A2 (KIMBERLY-CLARK CORPORATION), 23 January 1997 (23.01.97), abstract	1-13
A	US 4333979 A (SCIARAFFA ET AL), 8 June 1982 (08.06.82), column 3, line 1 - line 45	1-13

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 June 1999	09 -07- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Tomas Gustafsson/MN Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/00407

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5580418 A (ALIKHAN), 3 December 1996 (03.12.96), column 3, line 46 - line 65; column 4, line 32 - line 48; column 5, line 33 - line 50, abstract --	1-13
A	US 4446189 A (ROMANEK), 1 May 1984 (01.05.84), figures 8-13 --	1-13
A	US 5688258 A (J), 18 November 1997 (18.11.97), figure 4 --	1-13
P,X	WO 98027904 A1 (THE PROCTER & GAMBLE COMPANY), 2 July 1998 (02.07.98), page 5, line 11 - page 14, line 10, figures 1,2, abstract -- --------	1-7,10-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/06/99

International application No.
PCT/SE 99/00407

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0685214 A2	06/12/95	AU 696865 B	17/09/98
		AU 2039295 A	14/12/95
		CA 2150876 A,C	04/12/95
		CN 2237432 U	16/10/96
		JP 7328060 A	19/12/95
		US 5613960 A	25/03/97
WO 9702133 A2	23/01/97	AU 6389096 A	05/02/97
		CA 2222444 A	23/01/97
		CN 1200074 A	25/11/98
		EP 0846056 A	10/06/98
US 4333979 A	08/06/82	NONE	
US 5580418 A	03/12/96	AU 669571 B	13/06/96
		AU 5048693 A	19/05/94
		CA 2088392 A	07/05/94
		DE 69319996 D,T	15/04/99
		EP 0596532 A,B	11/05/94
		ES 2118873 T	01/10/98
		JP 6158501 A	07/06/94
		MX 9300425 A	31/05/94
		US 5370764 A	06/12/94
		ZA 9307185 A	26/05/94
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US 5688258 A	18/11/97	AU 3731395 A	02/05/96
		BR 9509296 A	07/07/98
		CN 1165475 A	19/11/97
		WO 9610973 A	18/04/96
WO 98027904 A1	02/07/98	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 09 November 1999 (09.11.99)	
International application No. PCT/SE99/00407	**Applicant's or agent's file reference** 110317 ARe
International filing date (day/month/year) 17 March 1999 (17.03.99)	**Priority date** (day/month/year) 27 March 1998 (27.03.98)
Applicant HEDENBERG, Peter et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

08 October 1999 (08.10.99)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Nestor Santesso

Telephone No.: (41-22) 338.83.38

16

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
110317 ARE		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE99/00407	17/03/1999	27/03/1998
International Patent Classification (IPC) or national classification and IPC		
A61F13/15		
Applicant		
SCA HYGIENE PRODUCTS AB et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
08/10/1999	27.03.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Martinez, C Telephone No. +49 89 2399 7510

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SE99/00407

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-13 as originally filed

Claims, No.:

1-13 as received on 06/03/2000 with letter of 02/03/2000

Drawings, sheets:

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-13
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations

see separate sheet

Reference is made to the following documents:

D1: EP-A-0685214

D2: WO-A-9702133

Re Item V

The subject-matter of Claims 1 to 13 does not appear to involve an inventive step in the sense of Articles 33(3) PCT.

Independent claims:

Claim 1

Document D1 (cited as a X document and cited in the description), which is considered to represent the most relevant state of the art, discloses the following features:

- a liquid permeable topsheet 2 made of fibrous material (D1: col2, l41-45);
- a liquid-guiding fibrous layer 6 (D1: col2, l48-52);
- the topsheet 2 contains 5% or more of thermoplastic synthetic fibers (D1: col2, l43- 45) and the fibrous layer 6 contains 5% or more of hot melt fibrous material (D1: col2, l48-50);
- the two material layers are bonded together (D1: col2, l35-37) at fused spots 7 by fusion of the hot material contained in them (D1: col3, l2-7);
- the topsheet 2 and the fibrous layer 6 are integrally bonded together in the direction of thickness defined between the upper surface of the topsheet 2 and the lower surface of the layer 6 at fused spots 7.

The liquid permeable topsheet 2 and the liquid-guiding fibrous layer 6 form therefore a material laminate, as claimed in Claim 1.

The subject-matter of Claim 1 differs only from document D1 in that the bonding areas are arranged in two or more groups with at least two bonding sites in each group, with the greatest relative distance between two bonding sites, which are situated adjacent to each other, in a particular group being less than the shortest distance between the group and its closest adjacent group.

Therefore, the subject-matter of Claim 1 appears to be new.

The problem to be solved by the present application is to provide a material laminate with good liquid-transferring ability and low rewetting and at the same time, with a high degree of pliancy, kindness to the skin and flexibility (see p3, l3-5). The good liquid-transferring ability is achieved through the bonding of the two layers in a particular pattern due to the higher density achieved in these bonded areas, in the application (see p3, l24-29) as well as in the prior art document D1 (D1: col3, l16- 34). Nevertheless, as disclosed in the description (p2, l23 to p3, l2), the material laminate described in document D1 does not provide a low rewetting (p2, l33 to p3, l2) and does not have a high degree of pliancy and kindness to the skin due to the large number of bonds present at a short distance from each other (p2, l27-29). In the present application, this is solved by providing a structure wherein the bonding areas are arranged in groups of bonding sites and wherein the distances between the groups are higher than the distances between the bonding sites within one group.

Document D2 (also cited in the application), discloses a laminate for use as a body side liner for personal care absorbent article, said laminate including two layers bonded together at bond lines to form a series of peaks separated by a series of valleys (D2: abstract + fig.1), the valleys being the bonded areas and the peaks the unbonded areas and the density in the valleys being higher than in the peaks (D2: p38, l6-11). Therefore, document D2 also provides a structure with areas having higher densities where a good liquid-transferring ability is achieved (D2: p.10, l.8-18). D2 also mentions that due to this valley/peak structure the laminate material provides improved dryness and comfort (D2: p10, l29-32). The laminate described in the example 1 of document D2 (D2: p.25) is made of a film which is 0.0254 mm thick and of a nonwoven web which has a thickness of 1.524 mm (D2: p.25, l.35), which is included in the thickness range claimed for the second layer (3) of the material laminate claimed (see Claim 9). Document D2 also discloses that the spacing between adjacent bond lines is approximately 4.5 mm (D2: p.27, l.4-5), which is included in the claimed range for the x value (see Claims 10 and 12). These bond lines can be considered as groups of bonding sites since document D2 discloses an embodiment (D2: fig.7) where the bond lines are not continuous but broken lines of bonding (D2: p.15, l.4-7). Therefore, the web described in document D2 is very likely to have a degree of pliancy, a bulk and a flexibility similar to the material laminate claimed.

Therefore, from Documents D1 and D2, it would be obvious for the person skilled in the

art to produce a laminate with groups of bonding sites, in order to obtain an increased liquid-transferring ability, and with distances between the groups of bonding sites greater than the distances between the bonding sites within one group in order to obtain a low rewetting and a high degree of pliancy and kindness to the skin.

The subject-matter of Claim 1 does therefore not appear to be inventive.

Claim 13

In view of the above conclusion, an absorbent product containing a laminate material, such as the one claimed in Claim 1, does not appear to be inventive.

Dependent claims:

Claims 2 to 5

Claims 2 to 5 relate to different shapes of the bonding sites which are well-known in the prior art. The additional features of Claims 2 to 5 do therefore not appear to be inventive.

Claim 6

Document D1 discloses that each of the fused spots 7 (corresponding to the bonding sites 4 in the application) is compressed to form a groove, the result being as the application (see p7, l11-17) an increased ability of the liquid to flow through the laminate material (D1: col3, l16-19). Therefore, the subject-matter of Claim 6 does not appear to be inventive.

Claims 7 and 8

In document D1, the topsheet (2) (corresponding to the first material layer (2) in the application) is also a nonwoven fabric (D1: col2, l41-43) and it is well-known to use as a nonwoven, a carded, thermally bonded material. The additional features of Claims 7 and 8 do therefore not appear to be inventive.

Claim 9

In document D1, the layer 6 is also a fibrous layer, the thickness of which is not disclosed, nevertheless the thickness claimed of 0.5 to 4 mm falls within a usual range

and is for example disclosed in document D2 (see above). The additional feature of Claim 9 is therefore not inventive.

Claims 10 to 12

Claims 10 to 12 relate to the distances between the bonding sites and the bonding groups, these additional features do not contribute to inventive step since the person skilled in the art would obtain the most appropriate distances by performing different tests.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/00407

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61F 13/15, A61F 13/50
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0685214 A2 (UNI-CHARM CORPORATION), 6 December 1995 (06.12.95), column 1, line 50 - column 2, line 8; column 3, line 35 - line 41	1-13
A	WO 9702133 A2 (KIMBERLY-CLARK CORPORATION), 23 January 1997 (23.01.97), abstract	1-13
A	US 4333979 A (SCIARAFFA ET AL), 8 June 1982 (08.06.82), column 3, line 1 - line 45	1-13

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
29 June 1999

Date of mailing of the international search report
09-07-1999

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer
Tomas Gustafsson/MN
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/00407

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5580418 A (ALIKHAN), 3 December 1996 (03.12.96), column 3, line 46 - line 65; column 4, line 32 - line 48; column 5, line 33 - line 50, abstract --	1-13
A	US 4446189 A (ROMANEK), 1 May 1984 (01.05.84), figures 8-13 --	1-13
A	US 5688258 A (J), 18 November 1997 (18.11.97), figure 4 --	1-13
P,X	WO 98027904 A1 (THE PROCTER & GAMBLE COMPANY), 2 July 1998 (02.07.98), page 5, line 11 - page 14, line 10, figures 1,2, abstract -- --------	1-7,10-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/06/99

International application No.
PCT/SE 99/00407

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0685214 A2	06/12/95	AU 696865 B	17/09/98
		AU 2039295 A	14/12/95
		CA 2150876 A,C	04/12/95
		CN 2237432 U	16/10/96
		JP 7328060 A	19/12/95
		US 5613960 A	25/03/97
WO 9702133 A2	23/01/97	AU 6389096 A	05/02/97
		CA 2222444 A	23/01/97
		CN 1200074 A	25/11/98
		EP 0846056 A	10/06/98
US 4333979 A	08/06/82	NONE	
US 5580418 A	03/12/96	AU 669571 B	13/06/96
		AU 5048693 A	19/05/94
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		DE 69319996 D,T	15/04/99
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